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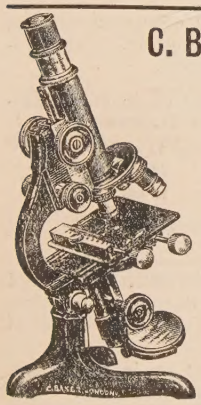

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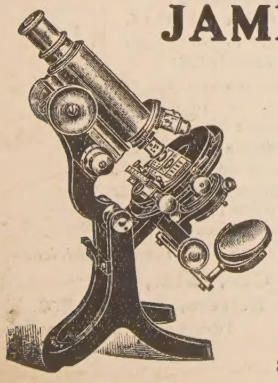

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TROPICAL DISEASES BUREAU.

TROPICAL DISEASES BULLETIN.

Vol. 8.] 1916. [No. 4.

TROPICAL DISEASES OF THE SKIN.

BRAULT (J.) & VIGUIER (A.). **Deux cas de kerion Celsi observés à Alger et due à une nouvelle espèce de trichophyton à culture faviforme.**—*Bull. Soc. Française de Dermat. et de Syph.* 1914–15. July–Dec. Vol. 25. No. 7. pp. 401–402.

The affection was observed in two brothers, aged eleven and five. The elder boy had multiple kerions on the scalp with abundant suppuration and crusts.

In order to obtain pure cultures unimpeded by staphylococci, affected hairs were implanted in the skin of a guinea-pig—from the hair of which cultures were made eight days after inoculation.

The Trichophyton obtained from the two cases was an ectothrix megaspore belonging to the faviform group. M. SABOURAUD considered it a new species, and it has been named by the authors *Trichophyton luxurians.*

P. S. Abraham.

BRAULT (J.) & VIGUIER (A). **Trychophyte de l'aiselle observée à Alger, due au** *Trichophyton acuminatum.*—*Bull. Soc. Française de Dermat. et de Syph.* 1914–15. July–Dec. Vol. 25. No. 7. pp. 402–403.

A girl aged 17 presented herself with erythematous scaly ringed patches in both axillae, which on microscopical and cultural examination were found to be due to *Trichophyton acuminatum.* Inoculations in a guinea-pig were positive. The lesions had existed for about a fortnight.

P. S. A.

LITTLE (E. Graham). **Case of Very Extensive Tinea circinata of Tropical Origin.**—*Proc. Roy. Soc. Med.* 1916. Feb. Vol. 9. No. 4. (Dermat. Sect.). pp. 55–56.

This was the case of a British soldier lately arrived from West Africa. The eruption began in the groin in September last, and spread over the greater part of the body. It consisted of large ringed patches and eczematoid surfaces resulting probably from irritation caused by the disease. The nails and scalp were not affected. A plentiful and

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coarse mycelium was found in the scales. Cultivation experiments had so far not succeeded. "The fact that the eruption began in the groin and so quickly assumed the eczematoid aspect, and that it nowhere affects the hair, points to the probability that the organism responsible is the *Epidermophyton inguinale,* and if so this case is certainly the most extensive the exhibitor has seen or read of."

P. S. A.

PUPO (João de Aguiar). **Um caso de Blastomycose.** [A Case of Blastomycosis.]—*Ann. Paulistas de Med. e Cirurg.* 1916. Vol. 6. No. 1. pp. 8–14. With 6 figs.

A case of blastomycosis ending fatally after a variety of treatments had been tried without success.

The patient was a girl, aged 15 years, with a good family history. Two years before coming under observation she had suffered from an enlargement of glands in the neck, which at first was painless but afterwards proceeded to suppuration. The abscesses were opened surgically, but the glands remained hard and indolent. Rather more than a year afterwards an eruption appeared on the face, and at the same time the glands began to suppurate afresh. On admission to hospital, the eruption was seen to consist of a symmetrical red patch on each cheek, which was elevated and composed of an aggregation of small red or yellow tubercles. The glands of the neck were manifestly enlarged. A Wassermann test for syphilis having given a feebly positive result, an injection of 45 centigrammes of salvarsan was given; but the only result was the production of a violent reaction in the lesions along with pain and fever, and a fresh outburst of suppuration in the glands. The aspect of the patient at this time is well shown in two photographic reproductions.

A sample of the pus from the glands having been drawn off by aspiration it was examined microscopically, and showed, after staining by Giemsa's method and iron-alum, the presence of numerous blastomycetes, having the shape of spherical corpuscles, from 10 to 20μ in diameter and provided with a nucleus and hyaline capsule. Planted out upon glucose-agar the pus, after an interval of 16 days, gave rise to a growth consisting of separate colonies of the size of a pin's head, and of a dark grey colour. These gradually coalesced, and at the end of two months covered the greater portion of the surface of the medium. In parts the surface of the growth appeared woolly, and was found to contain a mycelium composed of ramifying septate threads containing granules, which terminated in coccidia. Subcultures were made into Hansen's and Mayer's growing solutions for moulds, with the result of obtaining in each case flocculent white growth, which subsided at the end of 40 or 50 days to the bottom of the tubes. Pus, on the other hand, only gave a growth with Mayer's liquid. A piece of the affected skin of the patient was then excised and submitted to microscopic examination after fixing. It showed, upon section, hypertrophy of the epidermis with infiltration of the Malpighian layer, and microscopic abscesses which contained parasites. In the derma beneath were giant cells, some containing parasites. By means of Gram's method it could be seen that some of the parasites were in process of

division, as described by VIANNA, the dividing cells measuring from 15 to 25μ in diameter and containing from 15 to 20 Gram-positive granules, generally arranged round the periphery of the cell.

As the result of the histological examination it was decided to treat the patient with intravenous injections of iodide of sodium, 20 grammes of a 10 per cent. solution being given every other day; but the only result was to determine an intense local reaction, with further extension of the lesions. Iodide of potassium given by the mouth was equally unsuccessful. Further microscopic examination having shown the co-existence of streptococci in the tissues, four injections of anti-streptococcal serum were given without benefit, and a Wright's vaccine was also tried. Finally ten intra-venous injections of colloidal gold were given without any good result, and the patient at last succumbed from exhaustion. Details of the lesions found at the autopsy are promised in a future communication.

J. B. Nias.

BRIDRÉ (J.). **Sur le traitement des Blastomycoses.** [The Treatment of Blastomycosis.]—*Bull. Soc. Path. Exot.* 1916. Feb. Vol. 9. No. 2. pp. 73–74.

Commenting on ESCOMEL'S paper on human blastomycosis in Peru and Bolivia [this *Bulletin*, Vol. 6, p. 136] Bridré remarks that, although arsenical compounds may be without action on yeast fungi, in the human subject, in the epizootic lymphangitis of the horse intravenous injections of arseno-benzol, and novarseno-benzol, have rendered him great service.

J. B. N.

WADE (H. Windsor). **A Variation of Gemmation of *Blastomyces dermatitidis* in the Tissue Lesion.**—*Jl. Infect. Dis.* 1916. June. Vol. 18. No. 6. pp. 618–629. With 2 plates.

In the course of the microscopical examination of a number of cases of systemic blastomycosis a skin lesion of one case showed, in addition to numerous typical budding organisms, an abundance of minute forms suggesting sporulation. When specially stained by Mallory's aniline-blue connective tissue stain, these small bodies were shown to have been formed by the ordinary budding process.

The authors give a short account of the parasites found in the yeast-mould infections, and the differentiation of the budding blastomyces from the spore forming fungus of coccidioidal granuloma. The paper goes fully into the literature of the subject, and minutely discusses the microscopic and cultural characters of the fungus found in the case described.

P. S. A.

MASSEY (A. Yale). **Blastomycosis (?) in Central Africa.**—*Jl. Trop. Med. & Hyg.* 1916. Apr. 1. Vol. 19. No. 7. p. 79. With 1 plate.

In four years the author has observed about twelve cases resembling blastomycosis as described in books. Salvarsan has no apparent effect, thus excluding syphilis and yaws. Local applications were of no avail, but curetting had a good effect in one case. No cultures have been made.

The natives call the disease "Mulandula," and say that it may attack any part of the body and is incurable. Photographs of two cases—in each one leg being affected—are given.

P. S. A.

SARTORY (A.). **Présence du *Sporotrichum beurmanni* De Beurm. et Goug. sur un épi de blé.**—*C. R. Soc. Biol.* 1915. Dec. 31. Vol. 78. No. 20. pp. 740–742.

The fungus, observed on an ear of corn obtained in the neighbourhood of Nancy, was cultured on simple gelatin and Sabouraud's peptone glucose jelly, and yielded in eight days a ramifying mycelium with conidia grouped in glomeruli and with pyriform spores. On subculture on Sabouraud's and other media the characters showed the fungus to be probably identical with the human *Sporotrichum beurmanni* and this was confirmed by other tests and by the microscope.

Its pathogenicity was studied in rats—the virulence, at first small, being augmented by passing from rat to rat. It is interesting to have found *Sporotrichum beurmanni* as a saprophyte in nature—thus confirming GOUGEROT, who after three years systematic search met with it twice on the bark of a beech tree and a horse tail growing beneath near Termignon and on dried grains of oats near Chamounix.

P. S. A.

LECOMTE (A.) & HECKENROTH (F.). **Traitement et évolution d'un Mycétome à grains rouges.**—*Bull. Soc. Path. Exot.* 1916. June. Vol. 9. No. 6. pp. 346–351. With 1 plate.

This is a further account of the case reported by Dr. JOUENNE [see this *Bulletin*, Vol. 7, p. 128].

The tumour, larger than a man's head, was situated on the right knee and extended around to the popliteal space. The surface was nodulated and showed numerous fistular openings, exuding a more or less purulent and sanguineous fluid containing in suspension red grains of irregular form and from $\frac{1}{10}$ to $\frac{2}{3}$ m.m. in diameter. The general consistence of the tumour was firm and it was only tender on the posterior and internal part. The articulation of the knee was not affected, extension was normal and flexion only hindered by the size of the tumour behind. The crural glands were enlarged and hard, but not painful.

Under iodide of potassium in increasing doses of 2 to 6 grammes, the growth became much smaller in a few weeks, but diarrhoea set in and subsequently chest trouble developed and the patient died in six months.

P.m., tuberculosis was found in the pleura, pericardium, etc., and spleen and liver. No mycelial filament or spores of *Nocardia Pelletieri* were found in the internal organs.

The tumour had gradually diminished and almost disappeared, measuring now only 38 cm. around, and red grains could be found only in one place.

The patient had succumbed to a generalised tuberculosis, the course of which had probably been precipitated by the iodide treatment, but the case is interesting as showing the favourable effect of the drug on the mycetoma.

P. S. A.

CLEGG (M. T.) & HOBDY (W. C.). **A Case of Mycetoma in Hawaii: Its Etiology.**—*Amer. Jl. Trop. Dis. & Prevent. Med.* 1916. Apr. Vol. 3. No. 10. pp. 534–544. With 1 plate.

The authors of this good account of a case of Madura foot in Hawaii quote BOYER and SURVEYOR's description of the disease in India, and especially describe the streptothrix fungi cultivated by VINCENT and others.

The Hawaiian case—of the ochroid variety of the disease—which they report, was that of a native fisher woman whose left foot had been affected for five years after an injury on the sole from the coral. The painful swollen spot gradually enlarged developing sinuses with yellowish discharge, until the foot became extremely painful, twice the size and with numerous crater-like nodules on both surfaces and degeneration of all the tissues.

The streptothrix found in the yellow granules in the discharge and tissues resembled the "*Streptothrix madurae*" of VINCENT culturally and in staining reactions. It seemed to be but slightly, if at all, pathogenic in guinea-pigs, rabbits and monkeys.

A resumé is given of the cases of mycetoma occurring in America. The authors consider that the disease is a clinical type or variety of streptothricosis—"Streptothricosis pedis"; and that more than one species of streptothrix may produce the affection.

P. S. A.

BURRES (W. T.). **Mycetoma in Western Panama.**—*Amer. Jl. Trop. Dis. & Prevent. Med.* 1916. May. Vol. 3. No. 11. p. 610. With 1 plate.

A native of Chiriqui near the Costa Rica border, aged 50, gave a history of a wound in the foot 16 years previously, with subsequent development of a "wart" which slowly increased in size and the other foot became affected. When seen, sinuses and purulent discharges were "gradually honeycombing the feet." He gave no history of framboesia, syphilis or tuberculosis.

No account of the fungus causing the infection nor any microscopical data are given. It may be doubted indeed whether the case was really one of mycetoma. The illustration might well pass for some other affection.

P. S. A.

CATSARAS (Johannes). **Bemerkungen über neue Fälle von griechischem Myzetom. (Zweite Mitteilung).**—*Arch. f. Schiffs- u. Trop.-Hyg.* 1915. Dec. Vol. 19. No. 23. pp. 617–625. With 1 plate & 3 figs

The author gives an elaborate account of the microscopical structure of material from a case of mycetoma in a woman from Messini (Peloponnesus). The fungus differs from that found in his previous cases; the polymorphism being more defined, and the staining reactions rather different.

He alludes to BRUMPT's classification of the Madura foot fungi, viz :—(1) *Indiella mansoni*, (2) *Indiella reynieri* Brumpt, and (3) *Indiella somaliensis*, and considers that his first and last cases belonged to

the second category. A fourth case of Dr. MAKRYKOSTAS's, also in a young woman, who came from Melos, with a characteristic growth commencing in the sole of the left foot, is also described. The fungus in this, as in the second Greek case was shown to be the "*Streptothrix madurae.*"

The main conclusions are that :—(1) The occurrence of this tropical affection in native Greeks who have never been out of the country shows that the disease is indigenous ; (2) the fact that the cases came from different parts of the kingdom indicate its wide distribution ; (3) in the four cases three different kinds of fungi were found, which confirms BRUMPT's opinion that the disease may be caused by very different forms of mycelial growths.

P. S. A.

VADALÀ (Paolo). **Nuovi casi di dermatite di canna.** [Fresh Cases of Reed Dermatitis.]—*Malaria e Malat. d. Paesi Caldi.* 1916. Jan. Vol. 7. No. 1. pp. 14–17.

An account of four cases of dermatitis produced by handling dried reeds (*Arundo donax*), of which two are described at length. In the course of the night succeeding the day on which the reeds were handled the affected individuals, all males, were attacked with irritation and burning of the skin of the face, genitals, hands and arms, and also of the mucous membranes of the nose and throat, with lachrymation, coryza and fever. A certain amount of intestinal disturbance, evidenced by purgation, followed. The irritation proceeded to pustulation on the forearms, while the palms of the hands remained unaffected, probably on account of the thickness of the skin. The symptoms subsided in the course of five days, and were followed by desquamation of the epidermis of the affected areas. One of the patients had three subsequent attacks, at intervals of 15 days, each time on handling the same canes. It was observed that they gave off a black dust, due to the spores of the fungus which causes the symptoms [see this *Bulletin*, Vol. 6, p. 138, for previous references to this subject].

J. B. N.

de BERNADINIS (Virginio). **Ulcera fagedenica dei Paesi Caldi.** [Phagedenic Ulcer.]—*Morgagni.* 1915. May. Vol. 57. Pt. 1. No. 5. pp. 192–200. With 6 plates.

Notes on cases of tropical ulcer observed in natives of North Africa. Two, which were rapidly fatal, occurred in children, and were of the type generally denominated Noma or Cancrum oris. Illustrations are given of both. Vincent's bacillus was isolated in each case with its associated spirillum. Twenty cases of tropical ulcer of the legs were also noted in native soldiers, and in a native boy. From these cases the bacillus described by Le DANTEC as the causative agent of tropical ulcer was isolated in the shape of a straight bacillus, occasionally curved, non-motile, 10μ in length and $\cdot 25\mu$ in thickness, non-Gram-staining, but easily stained with ordinary aniline dyes. Cultivations were unsuccessful. This form also is illustrated in a micro-photograph.

J. B. N.

CARINI (A.). **Onyxis ulcéreux phagédénique.**—*Bull. Soc. Path. Exot.* 1915. Vol. 8. No. 10. pp. 715–720. With 1 plate.

In this paper an excellent account is given of an affection which seems to have been but little noticed in text-books on Tropical Medicine although it has been known since Dr. MAUREL's observations on the disease in French Guiana, published in the *Archives de Médecine Navale* in 1879, which he called "Onyxis ulcéreux." Dr. Carini has recently had the opportunity of examining a family—a mother and six children—all affected. They were German immigrants who had been three years in Brazil working at a coffee plantation. In each case the ulceration had commenced from a chigoe burrow, gradually increasing, invading the base and matrix of the nails and destroying the latter. They bled easily, exuded a foetid, sanguineous excretion, and were very painful. Microscopical examination showed numerous fusiform bacilli and spirochaetes—just as are found in ulcus tropicum.

The disease is particularly given to affect the colonists who go about with bare feet, and generally starts from some small wound or jigger bites and seem to have a preference for the big toe. It is very resistant to treatment; the author has found iodoform a useful application, but extirpation of the nail, curetting and cauterising the ulcer have been recommended as the most efficacious treatment by Dr. DECOURT who has dealt with more than fifty cases.

It is curious that in these cases "phagedenic ulcers" in other parts of the body are rare, although the presence of fusiform bacilli and "*Spirochaeta vincenti*" show that the disease must be considered a special localization of "Tropical ulcer."

P. S. A.

BREINL (A.) & PRIESTLEY (H.). **Notes on the Successful Treatment of Ulcerative Granuloma Pudendi by means of Tartar Emetic.**—*Med. Jl. of Australia.* 1916. Mar. 18. Vol. 1. 3rd Year. No. 12. pp. 237–239.

"Ulcerative granuloma" appears to be common among the aborigines of North Queensland, the Northern Territory and Western Australia. Treatment with nitric acid, caustics and excision is usually ineffective, even in early cases, and internal treatment with mercury, soamin and salvarsan have also failed. X-ray treatment has been recommended but has not been successful in two cases tried by the authors. This paper records an excellent result obtained by the intravenous injection of tartar emetic as first used by ARAGAO and VIANNA in similar cases in 1913.

The patient in the present instance was an aboriginal girl, aged about 20, who had had the genitalia extensively affected for several years.

The first injection was ·06 gram in 30 cc. of sterilised salt solution, and six injections of increasing doses were subsequently given intravenously, and nine afterwards per rectum. Distinct improvement set in after the second injection and after two weeks the whole granulating surface was covered by an epithelial layer. The patient was able to leave the hospital 14 days after the last injection. The success in this case confirms the observation of ARAGAO and VIANNA and justifies further trial of the treatment.

P. S. A.

de Souza Araujo (H. C.). **Estudo clinico do Granuloma Venéreo. Trabalho do Instituto Oswaldo Cruz. These Inaugural approvada com Distincção.** [A Clinical Study of Venereal Granuloma. From the Instituto Oswaldo Cruz.]—123 pp. With 7 plates. 1915. Rio de Janeiro: Typ. do Journal do Commercio, de Rodrigues & C.

This is a handsomely got up and very complete essay on the subject indicated by the title, which was presented by the author as a thesis for the degree of Doctor in the Faculty of Medicine of Rio de Janeiro. It is worthy of perusal, by those who are acquainted with the Portuguese language, for the detailed account which it gives of cases of the disease treated with tartar emetic, after the method of Vianna. A bibliography of 140 memoirs bearing on the subject is appended.

J. B. N.

de Souza Araujo (H. C.). **O granuloma venereo na America do Sul.** [Granuloma venereum in South America.]—*Arch. Brasilieros de Med.* 1916. Feb. Vol. 6. No. 2. pp. 111–132.

A well-written account of granuloma venereum, according to our present knowledge of this disease. Granuloma venereum was first recognised in South America by Neal and Ozzard, in British Guiana, in 1892. Since then it has been recognised in Dutch Guiana (P. C. Flu), in Brazil (43 recorded cases), the Argentine (two cases at Buenos Ayres, seen by the author in 1915) and Uruguay (Montevideo, four cases, besides two doubtful ones, observed by Rodriguez and the author jointly, also in 1915).

J. B. N.

Knowles (Frank Crozer). **Creeping Eruption (Larva migrans) of the Skin. Particularly in Regard to its Histologic Features, including the Demonstration of the Burrow and the Larva in the Epidermis.** —*Jl. Amer. Med. Assoc.* 1916. Jan. 15. Vol. 66. No. 3. pp. 172–177. With 9 figs.

The author describes a case of "creeping eruption" in a female child aged 20 months, who presented three serpiginous, gyrating lines on the buttocks and pubis. The rate of travel in one case was observed to be two inches in 24 hours. The lines were excised and cut serially in 3,000 sections, and 30 of the latter showed various portions of the larvae—being the first time, it seems, that the larva has been so demonstrated. He widely discusses the whole subject, and refers to the observations of a number of recent writers, but with the exception of Lee's case, reported in 1874, appears to ignore most of the older work on the subject. [In point of fact, a "creeping eruption" due to an oestridian larva, burrowing in or beneath the human skin, has long been known; cases indeed were recorded in Edinburgh more than 60 years ago. Dr. Walter Smith showed drawings and specimens taken from the skin of a girl in Ireland at the International Medical Congress in 1881, and the reviewer published in the *Medical Press and Circular*, April 12th, 1882, a description and drawing of a larva which had caused a "creeping eruption" in a farmer's boy in Ireland].

As Dr. Knowles says "there is still a considerable amount to be learned in regard to this interesting affection," and he will probably agree that the "creeping eruption" may be caused by the intra- or infra-dermal migration of more than one kind of larvae.

The paper is well illustrated by drawings of the eruption in his case and of the microscopic sections.

P. S. A.

PARHAM (J. C.). **Creeping Eruption. Report of a Case.**—*U. S. Nav. Med. Bull.* 1916. Jan. Vol. 10. No. 1. pp. 103–104. With 1 fig.

This note records a case of creeping eruption, also known as "larva migrans" or "dermamyiasis linearis migrans oestrosa," in a man who had been working in salt water marshes in South Carolina. A red itching lesion about the size of a 25 cent. piece was observed on the right leg. Three days later it began to extend downwards as a slightly elevated line one-sixth inch wide, at the rate of half-an-inch a day. Tincture of iodine locally failed to retard its progress. When, after a week, the man was seen at the dispensary, the line was progressing more rapidly and elevated about one-twelfth of an inch with small vesicles upon it. It had faded at its point of origin, and the active end entered a small indurated and inflamed area. Repeated search failed to find any larva. An intradermic injection of chloroform in advance of the eruption caused the "larva" to turn and go round the injected area, as it had done two days previously after an intradermic injection of phenol. A more extensive injection of chloroform cured the lesion.

The author had the opportunity of seeing a second case of "creeping eruption" at Charleston, in a boy who had three distinct lesions.

The paper is illustrated by an excellent photograph of the lesion in the man's leg.

P. S. A.

JOJOT (C.). **Observation de nodosités juxta-articulaires.**—*Bull. Soc. Path. Exot.* 1916. Apr. Vol. 9. No. 4. pp. 211-212.

The case was that of a young female native of French Guinea, who presented no symptoms of tuberculosis or syphilis. She complained of pain about the tumours which had appeared symmetrically and gradually grown for about two years, on both elbows and both knees. They did not involve the articulations. Treatment with iodide of potassium and mercury for a fortnight had no effect, and one tumour was excised. An elder sister had been similarly affected. These cases are rare in Guinea.

An excellent photograph is appended. P. S. A.

COMMES (Ch.). **Nodosités juxta-articulaires. Examen histologique.**—*Bull. Soc. Path. Exot.* 1916. Apr. Vol. 9. No. 4. pp. 212–214. With 1 plate.

This paper describes the microscopical characters of the nodule excised by Dr. JOJOT, as well as of two specimens obtained by Dr. FOLEY in Algeria.

On section, the consistence, which is neither osseous nor cartilaginous, appears to be particularly firm, parts being softer and easily torn into thin filaments. It would seem to consist of fibrous nodules embedded in a less dense matrix. Microscopically the nodules are seen to be of fibrous tissue, with sparse connective tissue cells which are more or less degenerated. The fibres have a characteristic arrangement, imbricated and with sinuosities. In some places vessels are seen which present no alteration and numbers of leucocytes are in their neighbourhood. Sometimes the vessels are in the centre of the fibro-connective formations—the cells and fibres being disposed in concentric layers. Staining with Gram and Giemsa gave no result.

Sections of the nodules from Algeria were similar, but the vessels and capillaries were more numerous; they seemed to be the centre of development of each little fibrous nodule. In none of the specimens could be found any parasitic growth—nor the fungus described by CAROUGEAU and FONTOYNONT.

P. S. A.

JEANSELME (E.). **Sur la structure des Nodosités juxta-articulaires.**—*Bull. Soc. Path. Exot.* 1916. May. Vol. 9. No. 5. pp. 287–290.

Dr. Jeanselme remarks upon the wide geographical distribution of these tumours, which he had been the first to observe in 1899–1900 in Cambodia, in Siam and in Laos, and had described under the name "juxta-articular nodosities." They have since been recorded in Java, Indo-China and the Sunda Islands, as well as in Algeria and other parts of Africa and in Madagascar [also lately in Hawaii].

He now describes the histological examination of nodules which had been obtained in Madagascar. The tissue was dense and sections showed three distinct zones: an internal one of degeneration, an external of inflammatory character and an intermediate transitional—the structure being broadly that of connective tissue. The bacteriological examination was negative in sections stained by Ziehl, Gram, eosin, etc. The structure was certainly not that of tubercular or syphilitic growths nor of ordinary fibrous or periarticular bursa transformed into sclerosed nodules. The hypothesis of tophus was suggested, but the position of the small tumours, their indolence, their structure and other clinical characters were against that view.

The author thinks it possible that they may have a parasitic origin.

Mons. JOYEUX's microscopical observations confirmed those of MM. JEANSELME and COMMES and he considers that the amelioration of the disease by potassium iodide is in favour of their mycosic nature.

P. S. A.

BRAULT (J.). **Note au sujet des nodosités Juxta-articulaires chez les indigènes.**—*Bull. Soc. Path. Exot.* 1916. June. Vol. 9. No. 6. pp. 341–343.

The author had recorded cases in Algiers in 1910 and 1911. In this paper he describes three cases, with histological details, two in natives, one in a European. The two former presented themselves for chancroids. The first had the subcutaneous nodules near the trochanters on each side, the tumours being pebble-like, lobulated

hard, movable and painless ; stained sections showed a fibro-vascular peripheral zone, and internally lobes of adipose tissue between fibrous bands ; no micro-organisms could be demonstrated. In the second case, there was one nodule the size of a walnut, near the left great trochanter, mobile, but attached by a fibrous band to the trochanter. It had given no pain nor trouble and had existed since childhood. Histologically it was entirely formed of fibrous tissue with masses of cells here and there—leucocytes, embryonic cells and occasionally giant cells in the centre of the masses. In many places epithelial cells were massed around the vessels, reminding one of the condition in tuberculosis. With Ziehl's and other colouring methods no micro-organisms could be found.

The third case had a larger tumour in the trochanteric region—the centre being filled with a semi-liquid whitish mass, with a fibrous wall. Here also no micro-organisms could be found.

After considering his own cases and the description of JEANSELME, GROS, NEVEUX, FONTOYNONT and CAROUGEAU, the author considers that the juxta-articular nodules met with in the colonies have not all the same origin, and that further study is necessary.

P. S. A.

McCOY (George W.) & HOLLMANN (Harry T.). **Juxta-Articular Nodules.**—*Amer. Jl. Trop. Dis. & Prevent. Med.* 1916. Feb. Vol. 3. No. 8. pp. 458–459. With 1 plate.

The authors report apparently the first case observed in Hawaii. The nodules were located on the extensor surface of the elbows of a full-blooded Hawaiian woman aged 45. One nodule below the left olecranon had existed for 30 years, two nodules on the right arm had only been noticed for one year. The older measured 3 cm. by 2 cm. and 2 cm in height, the others were much smaller. They were all smooth, hard, movable and not tender, and had developed slowly. The woman, who was in good general health, stated that a number of persons living in her district had similar nodules, some of them being on the ankles and knees.

P. S. A.

CASTELLANI (Aldo). **Note on Dermatitis cupoliformis.**—*Jl. Trop. Med. & Hyg.* 1916. Feb. 15. Vol. 19. No. 4. p. 41.

Professor Castellani describes a new disease which he calls Dermatitis cupoliformis or " tropical ecthyma."

It begins with superficial, dusky-red, slightly itchy spots, generally follicular or perifollicular, often mistaken for mosquito bites, and usually situated on the feet and legs. Some may disappear, while others slowly increase in size, become raised and infiltrated, but without vesication or pustulation. On the feet especially they often become cupoliform with subsequent formation of an ulcer in the centre with undermined edges. They may reach the size of a small cherry. The ulcers are painful and slow to heal. The condition is common in young European planters.

From the non-ulcerative lesions a pure culture can be obtained on agar of a streptococcus biologically different from all other streptococci

hitherto isolated in Ceylon. It is Gram-positive, does not liquefy gelatine and does not produce indol. Dr. Castellani has given it the name "*Streptococcus tropicalis.*"

The malady can be experimentally reproduced by inoculation of pure culture into and around hair follicles.

The nodules may be mistaken for (1) Oriental sore, from which it is at once distinguished by the absence of Leishmania; (2) ordinary ecthyma, but the initial lesions are not pustular; (3) pyosis tropica, in which the ulcer margins are not undermined; (4) and possibly for blastomycosis, Barkoo rot, syphilis, veldt sore and one or two other affections easily differentiated by their clinical and microscopical characters.

Dr. Castellani recommends an autogenous vaccine as the best treatment.

An excellent photograph of the affection accompanies the paper.

P. S. A.

KAMAKHYA PRASAD LAHIRI. **A Case of Impetigo Bullosa.**—*Indian Med. Gaz.* 1916. Mar. Vol. 51. No. 3. p. 100.

The author observes that though impetigo contagion is very common in Bengal, impetigo bullosa is comparatively rare. Its special features are the presence of big scabs, a large number of bullae, high fever, and recovery under simple treatment. He records the case of a Hindu gentleman who had blisters and pustules forming large crusts, with a temperature of 104° F. With quinine and sulphate of magnesia internally, and dilute Ung. Hydrarg. Nitrat. and Ung. Hydrarg Ammon. externally he was soon cured.

P. S. A.

ARCE (Julian). **Pie musgoso.** [Mossy foot.]—*Cronica Med.* Lima. 1916. Jan. Vol. 33. No. 631. pp. 6–20. With 10 figs.

An account of several cases of the condition first described by H. Wolferstan THOMAS as "mossy foot" [see the Manual of CASTELLANI and CHALMERS, Ed. 1913, p. 1602]. The illustrations are very good and typical, but the author does not carry the description of the disease much farther than THOMAS.

J. B. N.

LEPROSY.

HOFFMAN (Frederick L.). **Leprosy as a National and International Problem.**—*Jl. Sociologic Med.* 1916. Apr. Vol. 17. No. 2. [Whole No. 152.] pp. 70–88.

In this lengthy paper the author advances an ably argued plea for the general segregation and isolation of lepers, and especially for the establishment of national leprosaria in the United States of America. The number of cases reported on January 1st, 1912, in the U.S. and dependencies amounted to 146 for the mainland, Hawaii 696, Philippine Islands 2,754, and Porto Rico 28. The Home States most affected were Louisiana 71, California 23, Minnesota 18, and Massachusetts 13. In only 19 states is the disease notifiable. There are only two leper settlements, in Louisiana with 97 patients on record, and at Penikese Island in Buzzard's Bay, Massachusetts, with 15 patients. There is also an institution for lepers in San Francisco. At Molokai the present number of lepers is about 660. "Leprosy in Hawaii is relatively and actually on the decline, "a result," in the author's opinion, "primarily to be attributed to the effective plan of segregation at Molokai." These results "find their parallel in Norway, where "under a policy of effective segregation the leper ratio has been gradually reduced from 191·3 per 100,000 of population in 1856 to 61·9 in 1885, and to 13·5 in 1910." [By "effective" the author cannot mean "complete" or "absolute," for in no country where the segregation or isolation of lepers has been attempted has this ever been possible. In the case of Norway for instance, which is commonly but erroneously quoted as a good instance of "effective segregation," the fact is that not half the lepers are or have ever been completely segregated or properly isolated in that country. The greatest diminution of the leper census began in the year 1869, but it was not until 1877 that even the necessitous lepers were kept from begging and were to some extent domiciled in hospitals or with so-called "isolation" in their own homes. The law was not extended to "non-necessitous" cases until 1885. The decline has not been proportionately greater since then. The probability is that improved sanitation and hygienic conditions and better food have largely influenced the diminution of leprosy in Norway as in other endemic areas.]

One of the strongest points that Dr. Hoffman makes in favour of segregation is this: that in properly organised and well managed settlements such as at Molokai, Louisiana and Penikese Island the unfortunate lepers are far happier than when at large, for once they are found out by the public they are treated, in consequence of the general ignorance and fear of contagion, as pariahs, harried from pillar to post and their lives made miserable.

P. S. A.

McCOY (George W.). **Leprosy as a Major Pestilence.**—*Milit. Surgeon.* 1916. Feb. Vol. 38. No. 2. pp. 169–174.

Dr. McCoy observes that he has more than once seen previous attempts to feign leprosy for the purpose of gaining admission to the Molokai Settlement. He alludes to the terrible conditions described

by TONKIN in Northern Nigeria, where the lepers are "as a vast standing army" living insanitarily, and permitted to mix freely with the healthy population and to engage in all trades and occupations.

The number in the United States is estimated at somewhere around 500, less than half of them being confined in special institutions. "In the northern part of the U.S. the disease displays no tendency to spread, practically all cases being imported from endemic foci." "In Louisiana the majority of the cases are of local origin; one or two cases have developed in California in persons who appear not to have had an opportunity to acquire the disease elsewhere." In Hawaii there are now about 700 in segregation, and the annual crop of new cases is about 50, while in the Philippines there are about 4,000 in isolation with about 800 new cases annually.

In Hawaii, the segregation of lepers costs over 200,000 dollars a year, and in the Philippines the annual expense is greater. In spite of the heavy cost "one must insist on segregation in endemic foci, and at least on sanitary control of cases elsewhere."

P. S. Abraham.

JOHNSTON (John A.). **Leprosy.**—*Philippine Jl. Sci.* Sect. B. Trop. Med. 1915. Nov. Vol. 10. No. 6. pp. 365–370.

An interesting account of leprosy in the Philippine Islands is given in this paper. The disease appears to have been introduced from Japan whence 150 lepers arrived in 1633, and spread over the islands. In 1902, the Bureau of Health reported an estimate of 10,000. The first leper hospital was established in 1633 by the Franciscan monks. At the time of the American occupation, there were three leper hospitals, in Manila, Cebu and Ambos Camarines, with a total capacity of 400. The establishment of a leper colony was decided upon in 1902, and Culion Island selected. In 1906, 500 lepers were sent there, and at the present time their number is about 3,000. The author discusses the etiology of the disease and the characters of the bacillus, and expresses the view that for its transmission intimate contact is necessary. He admits that even in such conditions "infection is rare"; thus "of 225 healthy natives living in the same house as lepers only 4·5 per cent. acquired leprosy; and among the married, only 9 out of 181 contracted the disease from their leprous wives or husbands, as the case might be."

In reference to the etiological relation of insects to the disease—considering the ubiquity of acid-fast bacilli—doubt is expressed whether the reported positive findings of leprosy bacilli are not errors. At Culion 315 bed bugs were collected; 15 were examined individually and acid-fasts were found in the intestine in only one instance. The remaining bugs were ground up in lots of 50 in sterile salt solution, centrifuged and smears made. Acid-fasts were found four times.

In the absence of clinical signs he regards the presence of acid-fasts in the nasal mucus as of little importance.

P. S. A.

GOMEZ (Enrique). **Posible puerta di entrada de la lepra.** [A Possible Mode of Entry of Leprosy into the System.]—*Repertorio de Med. y Cirug.* 1916. Vol. 7. No. 8. pp. 350–352.

Attention is drawn by the author to the fact that in countries where the poorer classes go about barefooted and rarely wash their feet, cracks form in the skin of the heels which may easily be the portal of entry of lepra bacilli into the system. Such is the habit of the poorer classes in Peru, and in the author's experience leprosy shows itself first on the legs and feet, in that country, with remarkable frequency. Many authors insist that the lepra bacillus is excreted from the body in the stools, and in dirty surroundings the result will be that the bacilli will be picked up by dirty bare-footed people. [The author might have added, and especially children.]

He suggests that the reduction in leprosy, seen in many countries, has coincided with the more general habit of wearing boots and stockings.

J. B. Nias.

HOLLMANN (Harry T.). *B. leprae* **in the Circulating Blood of Lepers.** *U.S. Public Health Bull.* 1916. Jan. No. 75. pp. 15–19.

The author observes that if the bacillus is present in the blood of many cases of leprosy, the fact may play an important part in the study of insect transmission of this disease.

He refers to the observations of DOUTRELEPONT and WOLTERS, MUELLER, KOEBNER, MAJOCCHI and PELLIZARI, all of whom demonstrated acid-fasts in the blood during febrile periods. In the records of 44 investigations on the subject only 13 failed to find the bacillus in the circulating blood.

Employing the methods of CROW and RIVAS, with all precautions against contamination, the author examined the blood from a superficial vein in 22 cases, 17 being nodular. In six of the latter, acid-fast bacilli were demonstrable though in two cases only one bacillus was found. In all but one, bacilli were also present in a scraping of the skin at the site of puncture, though the skin was apparently healthy.

In one nodular female, during a period of new nodule formation with fever, numerous bacilli could be seen by simply making a smear of the blood and staining, but subsequent to this attack none could be found in her blood by any method used.

A full bibliography is appended of work on the subject.

P. S. A.

GOODHUE (William J.) & McCOY (George W.). **Leprosy in a Nineteen-Months-Old Child.**—*U.S. Public Health Bull.* 1916. Jan. No. 75. pp. 21–22.

Of 1,062 lepers under observation in Hawaii in the last 13 years only eight were under the age of five. The youngest case seen by either of the authors, prior to the one now recorded, was three years old, the child of leprous parents.

Reference is made to the claim of ZAMBACO of having seen congenital cases, and to NAKAYO's case in Japan of a new born infant with typical leprous infiltrations and bacilli, which appears to be the only authentic instance.

In the present case the child, a female, was aged 19 months, the father and mother were lepers of the nerve type, aged 41 and 40 years, and had been in the settlement for 20 and 16 years respectively. They had both had children by former spouses and none of them, as far as known, had developed leprosy.

The child's lesions were leucodermic, non-aesthetic areas on the face and thighs, of doubtful significance, and a reddish-brown raised nodule on the flexor surface of the left forearm. This on microscopical examination showed characteristic leprosy bacilli.

The infant had been removed within six hours of birth to non-leprous surroundings, as is the custom at the settlement and had not since been in contact with lepers.

This is the first child to develop leprosy among about 100 that have been born at Molokai, since the plan was adopted of removing the children at once after birth to non-leprous environment.

P. S. A.

VOTO BERNALES (Juan). **Sobre un caso de lepra.** [A Case of Leprosy.] —*Cronica Med.* Lima. 1916. Apr. Vol. 33. No. 634. pp. 115–116. With 1 fig.

Brief notes of an early case of leprosy, in a youth of 17 years, in which it was impossible to trace the origin of the infection. The lesions consisted of macules on the cheeks and the lobes of the ears, and infiltration of the left ulnar nerve with anaesthesia in the area of its distribution. Bacilli could not be demonstrated in the nasal secretion, but were found in excised portions of skin.

J. B. N.

HORN (J.). **Leprosy of the Upper Respiratory Tract, with Report of a Case.**—*Ann. Otol. Rhinol. & Laryngol.* 1914. Dec. Vol. 23. No. 4. pp. 765–770. With 4 plates.

The author reports the case of a female, aged 27, a native of Kurland, Russia, whose larynx was extensively involved in the disease. She had been nine years in America. Her mother died of leprosy five years ago. Before leaving Russia, she had been treated for some nasal affection, but it was not until six years ago when she presented herself for skin treatment that the diagnosis of leprosy was made.

All attempts at treatment, cauterisations, etc., failed to arrest the extension of the growth in the larynx and pharynx.

Drawings are given of the larynx and pharynx.

P. S. A.

BOWIE (J. T.). **A Case of Leprosy in a Trooper of the 1st (N.Z.) Expeditionary Force (ex Samoa).**—*New Zealand Med. Jl.* 1916. Apr. Vol. 15. No. 66. pp. 41–44; and *Med. Jl. Australia.* 1916. May 20. Vol. 1. 3rd Year. No. 21. pp. 415–416.

A returned trooper from Samoa, aged 28, came to the hospital with a skin disease of 11 months' duration. He was born in Bombay and when 15 years old went to Edinburgh and lived there 7½ years; then came to New Zealand and joined the Expeditionary Force. Two

months after going to Samoa, a swelling appeared on the left foot. Both feet became affected and one ulcerated. He returned to his trade as a plumber, and his affection was supposed to be chronic lead poisoning. On examination the clinical symptoms were those of early leprosy, with thickening of the skin in various regions, and pigmentations and anaesthetic areas. Acid-fast bacilli were found in smears from the nasal mucous membrane and in sections from skin nodules.

In the author's opinion the disease must have been introduced into the patient in India, giving an incubation period of about 12 years.

P. S. A.

ROGERS (Leonard). **Preliminary Note on the Use of Gynocardates Orally and Subcutaneously in Leprosy.**—*Lancet.* 1916. Feb. 5. pp. 288–290.

For a number of years past the author had employed gynocardic acid and sodium gynocardate internally for leprosy and had observed especially good results in three cases which are here described, the improvement in one case having persisted for two years, and frequent examinations for over a year having failed to show bacilli. Since Dr. HEISER's visit to Calcutta subcutaneous injections of gynocardates instead of oral treatment have been used with rapid improvement in a number of cases.

It appears to be of importance to inject pure gynocardate free from palmitic acid, very little local action—pain or swelling—being then produced. One or two grains up to a maximum of four grains once or twice a week have been administered, but it is probable that considerably larger doses might be given. In the " nerve " cases, marked increase of sensation together with diminution of the nerve thickening has been effected and ulcers have healed, and in several " tubercular " cases the dermal thickenings have diminished and become softer and the bacilli have lost their acid-fast characters.

" Although it is far too early to say what will be the ultimate result of the treatment, I am sure that the improvement which has been effected in a number of cases both of anaesthetic and tubercular leprosy has been far more rapid under the influence of the hypodermic injections of sodium and potassium gynocardates than under any other treatment I have tried, including nastin subcutaneously and chaulmoogra oil and gynocardic acid by the mouth."

Sir Leonard Rogers strongly recommends a careful trial of the method by others, and is hopeful that the less painful injections of gynocardates may ultimately prove to be a more rapid, effective and convenient method of treating the disease. [In 1890 Dr. Z. ROUX pointed out that gynocardic acid and gynocardates of soda and magnesia could be obtained from chaulmoogra oil, and were much better borne by leper patients. It was then being used with advantage at the St. Louis hospital. About that time the reviewer also employed them with some benefit in cases in London.]

P. S. A.

ROGERS (Leonard). **Gynocardates in Leprosy.** [Correspondence.]—*Indian Med. Gaz.* 1916. May. Vol. 51. No. 5. p. 195.

Sir Leonard Rogers refers to his article on this subject in the *Lancet* [epitomised above] and as highly coloured accounts of the treatment he is now adopting have appeared, he here shortly gives an account of the method he recommends, and again repudiates any claim to have discovered a cure for the disease, although his experience so far of the effect following the injection of gynocardates in leprosy justifies him in recommending a trial of the method by others. The gynocardates can be given in 2 grain pills after meals, or preferably by subcutaneous injection, "several months being required to produce marked improvement."

P. S. A.

MCCOY (George W.) & HOLLMANN (Harry T.). **The Chaulmoogra Oil Treatment of Leprosy.**—*U.S. Public Health Bull.* 1916. Jan. No. 75. pp. 3–10.

The authors review the literature bearing on the treatment of leprosy by chaulmoogra oil, and especially refer to its administration by hypodermic injection. According to DYER, it was first used hypodermically by BLANC of New Orleans in 1888, but with results "that did not appear to justify a continuance of the experiment." It was then so employed by TOUSTOULIS of Cairo, who reported his favourable results in 1899. CASTEL used it in 5 gram doses subcutaneously, and called attention to the danger of fatty embolism, which occurred in two of his cases. Many other observers have tried the method and more recently HEISER in the Philippines.

In Hawaii chaulmoogra oil has been the most popular remedy since 1886—many cases have benefited. The hypodermic use of the oil has been tried by the authors in 42 cases, 16 of which have received injections for periods of 10 to 17 months. Of these, 10 are "improved," four are "stationary," and two are "progressive." The majority have been also taking the oil by the mouth and a number of them have had carbon dioxide snow applied to the lesions. One case "has improved to such a degree as to make it impossible to find acid-fast bacilli in the smears from lesions."

A weekly injection was given of 5 cc. of a mixture containing 50 per cent. of oil, according to the formula of JEANSELME [*La Presse Medicale*, 1911] and MERCADO'S used by HEISER [*Report of Bureau of Health*, Philippines, 1914]. Unfavourable complications, abscesses, fainting, coughing, sometimes occur.

The authors' experience agrees with the conclusions of most observers that the oil is helpful in many cases of leprosy, and that the hypodermic method though not free from complications, has given good results, and is worthy of further trial. They are sure, however, "that the use of chaulmoogra oil as at present practised is not the solution of the problem of the therapeutics of leprosy."

P. S. A.

VAHRAM (M.). **Le traitement de la lèpre par les injections intraveineuses d'huile de chaulmoogra.**—*Progrès Méd.* 1916. Feb. 5. No. 3. pp. 19–20. With 1 text-figs.

After many attempts, the author has succeeded in preparing a "pseudo-colloidal" emulsion of chaulmoogra oil with gum arabic suitable for intravenous injection. The toxic dose tested on rabbits and dogs was 0·004 per kilogram of animal; the therapeutic doses employed in the human subjects were, in proportion, 20 times weaker.

Two cases of M. BROCQ's were placed under treatment. One presented open lesions with complete insensibility and numerous nodules, had been diseased for 20 years, and had been treated in various ways without much effect; the other had pigmented patches and anaesthetic areas for eight years, and had also been treated with chaulmoogra oil internally with but little benefit.

Each patient received about 30 intravenous injections, no reactions or deleterious effects have been produced, and the curative results have been very remarkable. The open lesions have healed and complete sensation restored; in one case amelioration commencing after the eighth injection.

The author recommends the first injection to be 1/4 cc., progressively increased by 1/10 cc. until 2 cc. have been given, and after the 20th intravenous injection others may be given subcutaneously. Both intravenous and subcutaneous injections may be administered every second day. This new method of giving chaulmoogra oil is particularly notable in view of the small doses required to obtain rapid and obvious results without the inconvenience and disagreeable effects generally produced by its administration in other ways. It certainly deserves an extended trial.

P. S. A.

MCCOY (George W.) & HOLLMAN (Harry T.). **Carbon Dioxide Snow in the Treatment of Leprosy.**—*U. S. Public Health Bull.* 1916. Jan. No. 75. pp. 11–13.

The local use of cold in cancer led LIE in 1904 to apply ethyl chloride and anestile to leprosy lesions. WAYSON in Honolulu first used solid carbonic dioxide about five years ago.

The authors have treated 31 cases, 27 being nodular, three of them mixed and one of the anaesthetic type. One case with small indurations has had the snow over a period of nearly three years, and has shown the most marked improvement—indurations have been absorbed leaving pigmented areas. All diseased areas have been treated and have been bacteriologically negative for about six months. This case also received chaulmoogra oil by mouth and by injection.

Seventeen of the cases treated showed diminution in the size of the lesions but all remained microscopically positive; 10 showed no improvement. "Probably the beneficial action is due to the inflammatory reaction set up."

P. S. A.

DENNEY (Oswald E.). **The Treatment of the Retrogressive Skin Lesions of Leprosy with Basic Fuchsin.**—*Philippine Jl. Sci.* Sect. B. Trop. Med. 1915. Nov. Vol. 10. No. 6. pp. 357–363. With 3 plates.

In view of MAY and HEIDINGSFELD's successful results with basic fuchsin in chronic ulcers, the author tried it in 132 patients selected from the Culion Leper Colony, as a germicide and epithelial and granulation tissue stimulant. Cotton pledgets soaked in 1 in 1,000 aqueous solution of basic fuchsin were packed into the lesions and kept in place by bandages.

Ulcerated nodules responded rather slowly. One case in four was eventually healed and another showed considerable improvement. Neuropathic ulcers which had long resisted other treatment quickly improved; 15 out of 33 cases healed completely and only three did not improve. Of six cases of infected neuropathic ulcers four continued to complete repair. Four simple and infected burns all did well. Fifty-three cases of perforating ulcers were treated, 12 were completely repaired and 31 improved. The treatment was also successful in many cases of gangrene.

The paper is illustrated by three plates of photographs.

P. S. A.

MARCHOUX (E.). **Transmission de la lèpre par les mouches** (*Musca domestica*).—*Ann. Inst. Pasteur.* 1916. Feb. Vol. 30. No. 2. pp. 61–68.

The author refers to the various observations previously recorded on this subject, and especially to the experiments of WHERRY, CURRIE and LEBOEUF, who all found the bacilli in the intestines or dejecta of flies which had fed upon leprosy ulcers,, etc., and surmised that by means of flies leprosy may be communicated. As the bacillus of human leprosy is not inoculable in animals, this hypothesis could not be experimentally verified.

The author therefore experimented with rat leprosy, which can be inoculated in healthy rats.

Flies were fed upon crushed leprous nodules and kept in a receptacle with white rats, which are very sensitive to the disease, and which had wounds or pieces of skin cut from their backs.

Numerous observations carried over many months and control experiments showed (1) that the flies conveyed the bacilli of rat leprosy on their feet and bodies; (2) that the bacilli will not live in the intestine of flies; (3) that there is not an emission of excrement every time a fly feeds; (4) that infection only takes place in the immediate neighbourhood of the diseased rat, because the bacilli carried by the fly are quickly dried and rendered inert.

P. S. A.

CLEGG (Moses T.). **The Cultivation of a Nonchromogenic Acid-fast Bacillus from a Case of Nodular Leprosy.**—*U. S. Public Health Bull.* 1916. Jan. No. 75. pp. 23–25.

Small particles of a nodule containing a large number of acid-fast bacilli were inoculated in 20 tubes of media growing amoebae and *B. cholerae* and incubated at 37° C. for two weeks. Four of the tubes

showed enormous increase of "acid-fast bacteria." Control tubes, but without the amoeba-cholera combination, showed no increase of lepra bacilli in the same time. After transplanting once a week in amoeba-cholera cultures for six weeks, the acid-fasts were obtained in pure culture by heating at 60° C. for half an hour, so killing the vibrios and amoebae. The acid-fasts grew readily alone when transplanted. They were small rod-shaped organisms, with tendency to lie in bundles. They produced no chromogen, but otherwise resembled other cultures isolated from lepers. Smears stained faintly with ordinary basic stains, and smears from young cultures did not lose the carbol-fuchsin stain when treated with Gabbett's solution, or after washing for three minutes in absolute alcohol. The growth on glycerine agar was abundant after the sixth day and no pigment was produced; the colour resembled that of tubercle bacilli on similar media.

A guinea-pig inoculated in the thoracic region from a 24 hour culture died three months later. The only gross lesions were congestion of the kidneys, and a small nodule in the left fore-leg showing a large number of acid-fast bacilli, singly and in masses, similar to those found in nodules from lepers. There were no enlargements of glands or other evidence of tuberculosis. Other guinea-pigs inoculated from this nodule, remained free from tubercle.

P. S. A.

McCoy (George W.) **A Note concerning the Favorable Influence of Glucose on the Growth of Acid Fasts.**—*U.S. Public Health Bull.* 1916. Jan. No. 75. pp. 27–31.

It being observed that an acid-fast culture isolated from a leprous nodule by means of symbiotic growth, grew luxuriantly on agar containing grape sugar, repeated experiments were made to determine the amount of carbohydrate required to influence several other slow-growing acid-fasts. Even one in 1,000 had a favourable effect, but one per cent. was most efficacious, especially in solid media. Experiments with other sugars were made, and they showed that glucose and laevulose had the best influence.

The details are given in a number of tables.

P. S. A.

Harris (Wm. H.) & Lanford (John A.). **The Agglutination Reaction with Sera derived from Human Cases of Leprosy and from the Experimental Animal upon Various Members of the Acid-fast Group.**—*Jl. Med. Res.* 1916. May. Vol. 34. No. 2. [N. Ser. Vol. 29]. Whole No. 156. pp. 157–167. With 1 fig.

In the course of experiments on the cultivation of *B. leprae*, the authors have attempted to differentiate and identify the various acid-fasts isolated by the different workers, and among other biological methods have tried to find specific agglutinins for such organisms. The sera tested were obtained from 20 cases of different types of leprosy at the Louisiana Leper Home, and also from rabbits in which different intensive efforts were made to produce immune substances.

The strains of Clegg, Currie, Brinkerhoff, Bayon and Duval were employed, as well as three types of tubercle bacillus—human,

bovine and avian, *B. phlei*, dung strains of MOELLER, and acid-fast cultures of KORN and KARLINSKI. An emulsion of Hansen bacilli from a human nodule was also used.

The difficulty of preparing a suspension wherein the bacilli could be properly separated was met by a device described and figured.

Copious details and tables relating to their observations are given with full references to the work of other observers.

The authors say that "the various methods employed in these experiments with acid-fast micro-organisms seem to be of little avail in developing or utilising the agglutinins for distinct differentiation or for identification purposes."

The conclusions arrived at are :—

"(1) The agglutinin present in the sera of the human subject affected with leprosy is usually low in titer and inconstant in its action.

"(2) The employment of this procedure, therefore, has proved of no avail in serving to authenticate any of the various cultures isolated from the leprous lesion of the human as the human bacillus.

"(3) The sera derived from rabbits inoculated with various bacillary antigens yield agglutinins likewise inconstant in amount and erratic in their action.

"(4) Sera derived from these inoculated animals do not serve to differentiate the various species employed in these experiments but suggest a group relationship.

"(5) Until some further refinement in these procedures is devised but little reliability can be placed upon this type of test as a means of identification of any culture isolated from the lesion of leprosy as the bacillus of Hansen."

P. S. A.

SUDHOFF (K.). **Einige Dokumente zur Geschichte der Lepraprophylaxe in Süditalien in der 2. Hälfte des 13. Jahrhunderts.** [Documents on the History of Leprosy Prevention in Southern Italy, in the second half of the thirteenth century.]—*Arch. f. Gesch. d. Med.* 1915. Aug. Vol. 8. No. 6. pp. 424–429.

The author has investigated ancient documents in the archives of Naples which refer to more stringent measures being adopted in the 13th century for the separation and seclusion of lepers and their belongings from the healthy community, as it had been found difficult to keep them in the asylums.

The various orders bearing on the subject in Latin are quoted in this paper. It would appear that there was considerable opposition to these orders and that many lepers were found to be at large. The municipalities in some cases contributed to the support of the establishments, which were not numerous in South Italy, although this was not compulsory. The State defrayed the expenses of the few cases which they sent to the institutions.

P. S. A.

PLAGUE.

CREEL (R. H.). **The Extension of Plague Infection of the Bubonic Type.**—*Amer. Jl. Pub. Health.* 1916. Mar. Vol. 6. No. 3. pp. 191–221. With 4 maps.

The writer criticises the conclusions arrived at by the Indian Plague Commission with regard to the spread of plague infection by means of plague infected fleas, carried about on the clothing of persons who may not themselves be suffering from infection. He considers that the evidence adduced by the Commission in support of their contention that plague was introduced into Sien, Wadhali, Parel and Warli villages from Bombay by clothing containing infected fleas may be rejected as being unconvincing, and believes that the Indian workers attributed too much importance to coincidence and did not sufficiently consider the factor of rat migration or transportation in merchandise.

Creel's paper contains an analysis of the cases of human plague which occurred in San Juan, Porto Rico in 1912, Havanna, Cuba in 1914, and in New Orleans 1914–1915. In the Porto Rico cases, on every occasion the possibility of direct infection from rodent sources was clearly manifest and the unlikelihood of infection from human sources was equally apparent. With regard to the intra-urban spread of the disease the infection adhered to the railroad, despite the fact that a very large proportion of the travel out of San Juan is across country. The eradication campaign (as in the case of San Francisco in 1907–8) was based on the assumption that the intra-urban extension of infection was brought about by migratory rodents, and very little weight was given to the efficacy of fumigation of the habitation of human cases as an eradicative measure. "If the eradication results are any index, then the argument of rodent migration versus flea transportation is strongly in favour of the former."

The general conclusions arrived at by the writer are summarised as follows :—

"1. Diffusion of plague infection within a city results, chiefly if not entirely, from migration of infected rodents.

"2. The transmission of plague by flea-infested clothing from a human case is a remote contingency.

"3. The possibility of transmission of infection by loose fleas in merchandise is evident, but improbable because the habitat of plague-carrying fleas is in and about the burrows of rodents and on their bodies, and when temporarily separated therefrom the natural tendency of these parasites is to regain such habitat.

"4. The travel of infection from one community to another is generally accomplished by infected rodents transported in merchandise.

"If such conclusion be correct, the eradication of plague is chiefly dependent upon reduction or relative destruction of the rodent population by the various means employed, as trapping and poisoning, aided and supplemented by rat-proofing, without any considerable attention to human plague incidence or to the movement of the travelling public.

"The extension of infection into clean territory can be reasonably prevented by supervision of outbound shipping, deratization of ships (fumigation), rat-proofing of railroad cars, inspection of cargo, requiring it to be from rat-proof wharves or warehouses; or subject to inspection to insure its being rat-free, or fumigated if need be. To these measures additional safety can be secured by restrictions as to loading—ships to be fended off from docks with rat guards on all communicating lines, or to load at anchor by means of lighters, and railroad cars to be permitted to load only during daylight, closed at night if only partially loaded and to receive freight only from rat-proof buildings."

R. St. J. Brooks.

CREEL (R. H.). **The Prevalence of Bubonic Plague and its Control.**—*Milit. Surgeon.* 1916. Mar. Vol. 38. No. 3. pp. 269–280.

The grave error of anti-plague work has always been the adoption of an eradication standard based on the status of the human instead of the rodent case incidence, the reason for the misleading standard being due to the fact that the occurrence of human plague is readily apparent, while the status of rodent plague can only be ascertained by a long continued and vigorously sustained campaign against the rat population. Sanitary effort should be concentrated on the problem of the best methods for bringing about a reduction of the rodent population, the writer being of opinion that if the latter can be sufficiently reduced (from 50 per cent. to 80 per cent. of the usual number), and congested rats centres eliminated so that the remaining rats are well scattered, plague will disappear without any pulicidal measures having to be adopted.

In dealing with outbreaks of human and rat plague, the following scheme, based on the experience of the United States Public Health Service may be adopted :—

- General measures
  - Survey
    - (*a*) Plague laboratory
      - Examination of rodents.
      - Examination of human plague suspects.
    - (*b*) Delineation of infected area
      - Rodent examination.
      - Epidemiology of human cases.
      - "Sentinel" guinea-pigs.
  - Eradicative
    - Rodent destruction
      - Trapping.
      - Poisoning.
      - Miscellaneous.
    - Rat-proofing
      - Protection of food supply.
      - Elimination of harborage.
  - Restrictive
    - Fumigation SO_2, CO, HCN
      - Ships.
      - Cargo or R.R. freight.
      - Baggage.
    - Rat-proofing
      - R.R. cars.
      - R.R. stations and freight warehouses.
- Special measures (Applied to foci)
  - Evacuation
  - Intensive rodent destruction
    - Fumigation $HCNSO_2$.
    - Immediate removal of harborage.
  - Flea destruction
    - Fumigation.
    - Coal oil emulsion.
    - General cleanliness.
    - Attention to household pets (cats and dogs).

R. St. J. B.

VÉCSEI (Ferdinand). **Beitrag zur Epidemiologie der Pest. (Die Pest in Schanghai.)** [Contribution to the Epidemiology of Plague. (Plague in Shanghai).]—*Wien. Klin. Woch.* 1915. Dec. 30. Vol. 28. No. 52. pp. 1445–1446. With 2 maps.

In this paper an account is given of the plague incidence and methods of eradication adopted in Shanghai during the years 1908–1912. The infection was conveyed from South China in 1908 by means of ship's rats, the first plague infected rodent being found at the docks situated in the eastern quarter of the town. In spite of energetic sanitary measures the disease soon spread to the Chinese quarter, Chapei, and during the succeeding year (1909) the greatest number of infected rats were found in the Chapei neighbourhood, and in the adjacent northern district. In this district of the European settlement the first case of human plague occurred. The following table shows the incidence and distribution of rat infections throughout the period in question :—

Year.	Number of dead rats found.	Number of plague infected rats found.					Number of rats trapped and poisoned.
		E.	N.	S.	W.	Total.	
1908 8 to 31 Dec. ..	1,329	33	11	5	0	49	2,209
1909 ..	17,364	81	59	42	5	187	91,833
1910 ..	19,559	9	200	30	10	249	216,879
1911 ..	14,929	0	118	10	10	138	177,048
1912 ..	11,988	5	62	26	2	95	154,005

The methods of combating the infection are summarised as follows :—

"1. The dead rats were sent to the Laboratory daily, in order to determine the locality, and spread of the infection.

"2. In order to deprive the rats of their nourishment, the daily house refuse was made inaccessible to the rats, through the employment of cemented, closely-covered containers. This was quickly accomplished.

"3. The houses were rendered rat-proof in two different ways :—

"(*a*) 'Temporary,' through cleansing, disinfection, removal of fleas, repairs of gross delapidations.

"(*b*) 'Permanent' through rebuilding.

"4. Rat destruction through poison, etc.

"5. Vaccination."

R. St. J. B.

de RAADT (O. L. E.). **Contribution to the Knowledge of the Epidemiology of the Plague in Java.** [Also in Dutch.]—*Mededeelingen van den Burgerlijken Geneesk. Dienst in Nederl. Indië.* 1915. Vol. 4. pp. 20–38. With 3 plates & 1 fig.

The species of fleas on Javanese rats are of some importance in the determination of the locality from which the animals are derived.

Out of 2,499 house rats caught in-doors, the "flea index"—i.e., the average number of fleas per rat, for *Xenopsylla cheopis* was 0·96 and for *Pygiopsylla ahalae* 0·2, while out of 526 field rats caught in the fields, the indices were 0·12 and 0·03 respectively, and out of 823 house rats caught in the fields the indices were 0·42 and 0·07 respectively (VAN LOGHEM). From investigations by the author in the coffee plantations in September and October 1913, on 382 rats (of which 84 per cent. were house rats), the flea index for *Xenopsylla cheopis* was 0·01 and for *Pygiopsylla ahalae* 0·64, while on 147 rats (of which 93 per cent. were house rats), caught in the houses during the same period the indices were 0·59 and 0·34 respectively. It thus appears that *Xenopsylla cheopis* is most prevalent on rats caught indoors, much less so on rats caught in the fields and nearly entirely absent from rats taken from the coffee plantations, while *Pygiopsylla ahalae* is most prevalent on rats from the coffee plantations, much less so on rats in the houses and least of all on rats from the fields. It would seem therefore that the necessary conditions for the development of *Xenopsylla cheopis* are solely to be found indoors and that this flea may to a certain extent be called a house flea. Its appearance on rats taken in the fields and in the coffee plantations can only be explained by its transportation from the house by means of house and field rats. The conditions for the development of *Pygiopsylla ahalae*, on the other hand, are most favourable in the coffee plantations and in the woods. Whether these conditions are also present indoors is doubtful, the probability being that this flea is introduced afresh by the rats which live in the coffee plantations.

With regard to the emigration of rats from village to village and its relation to the spread of plague, an attempt was made in November 1911 to ascertain the source of rat migration by means of "proof houses," the idea being that if the rat emigrated because it had no suitable place in which to nest, it would avail itself of the very first opportunity to live undisturbed. Five houses were erected and placed at various distances from some villages. At the end of a week one of the houses was occupied by a house rat, which must have travelled at least 230 metres from the nearest village. An easier method of research was adopted later, i.e., by digging up rats living in underground holes. Working in this way, a not inconsiderable number of house rats were included in the catch. Five house rats (6·7 per cent.) among 74 rats were caught in the open fields, the average distance to the nearest village being more than 200 metres. That these five rats were not house rats habitually living out of doors, was shown by the fact that the fleas with which they were infested were *Xenopsylla cheopis*; the animals must therefore have very recently have left the dwelling house. A year and a half later the investigation was continued, the excavations taking place at an average distance of 600 metres from the nearest village. From 5 to 9·6 per cent. of the rats caught in the rice fields from the middle of May to the end of July were house rats; the rest were field rats. Further it was made clear that the Cheopis index of these house rats was 0·44, while the indices of the house rats caught in the villages and of the field rats were 1·15 and 0·15 respectively, the conclusion again being that these house rats caught in the fields did not belong to the indigenous inhabitants of these fields but must have emigrated from the houses.

R. St. J. B.

de Raadt (O. L. E.). **Can the Plague be spread by Head-Lice?** [Also in Dutch.]—*Mededeelingen van den Burgerlijken Geneesk. Dienst in Nederl-Indië.* 1915. Vol. 4. pp. 39–40.

Swellengrebel has shown that *Pediculus vestimenti* is capable of transmitting plague infection [see this *Bulletin*, Vol. 5, p. 24]. The following experiments devised by De Raadt indicate the possibility of the disease being also spread through the agency of the head louse, *Pediculus capitis.*

" The head-lice were obtained by combing the luxuriant hair of a female plague patient; these parasites were afterwards rubbed fine in a mortar with physiological salt-solution, and with this mixture rodents were inoculated both subcutaneously and cutaneously. By collecting the head-lice exclusively from the corpses of plague patients and not from living patients, the chances for positive results were made as great as possible, because in cases of bubonic plague, an intense bacteriaemia generally develops in the later stages of the disease.

" Altogether five inoculation experiments were made, of which a short review is given below :—

Rodent I. Subcutaneous inoculation.
On 23/4/13 with 10 headlice.
„ 25/4/13 „ 32 „
„ 28/4/13 died of plague.

Rodent II. Cutaneous inoculation.
On 24/4/13 with 10 headlice.
„ 26/4/13 „ 7 „
„ 28/4/13 „ 8 „
„ 4/5/13 died of plague.

Rodent III. Subcutaneous inoculation.
On 30/4/13 with 7 headlice.
„ 3/5/13 „ 9 „
„ 6/5/13 died of plague.

Rodent IV. Cutaneous inoculation.
On 5/5/13 with 27 headlice.
„ 9/5/13 died of plague.

Rodent V. Subcutaneous inoculation.
On 6/5/13 with 15 headlice.
„ 8/5/13 „ 8 „
„ 9/5/13 „ 40 „
„ 12/5/13 died of plague.

" Result: Of five inoculation experiments, 100 per cent. were positive.

" This proves that head-lice which have sucked the blood of plague-patients, have absorbed the plague virus, and must consequently be considered capable of transmitting the disease from one person to another."

R. St. J. B.

de Raadt (O. L. E.). **The Loss of Fleas from the Living Rat.** [Also in Dutch.]—*Mededeelingen van den Burgerlijken Geneesk. Dienst in Nederl.-Indië.* 1915. Vol. 4. pp. 17–19.

These researches were made with the view of ascertaining the loss of fleas from rats in normal circumstances and as to whether the fleas, which are in such circumstances "deprived of their food," are sufficiently numerous to be likely to infect human beings with bubonic plague. Five rats, which had been freed from fleas were taken, and on each of these rats twenty fleas were let loose. The fleas had previously undergone partial starvation. Subsequently each rat was placed in a trap, and the traps were suspended at a height of 1·5 metres from the ground. Towards evening the rats were removed to a second series of traps which were hung in the same manner as the first series, but at a considerable distance from them. The rats were kept in the second series of traps till the following morning, after which they were taken back to their original traps. In this manner the running away of the rat out of its nest was imitated. Only 16 (20 per cent.) of the original total of 80 fleas were recovered, that is to say, in less than 48 hours 80 per cent. of the fleas had disappeared from the fur of the rats. In a control series, in which the rats were not removed but placed at the uninterrupted disposal of the fleas, only 37 per cent. of the fleas disappeared. A second series of experiments gave similar results; in the intermittent experiment 76 per cent. of the fleas disappeared while in the uninterrupted control only 38 per cent. of the fleas were missing at the end of the experiment. That the loss of fleas was really due to the migration of the rats could easily be proved by the presence of the insects in the rat traps and also on the floor beneath the traps and in the fur of rodents placed under the traps.

"From these experiments it therefore appears that when the rats are not continually in the immediate neighbourhood of the fleas (scarcity of rats) the total loss of fleas from living rats is considerably greater (38–43 per cent. of the total number of fleas) than in those cases where the host remains continually within reach of the fleas.

"This fact must be considered of importance when investigating the possibility of human beings becoming infected with bubonic plague by *live* rats which have only temporarily remained in the neighbourhood of man."

R. St. J. B.

de Souza, Jun. (Antonio). **Quelques considérations sur la peste humaine.**—*Bull. Soc. Portugaise des Sci. Nat.* 1913. Vol. 6. No. 3. pp. 119–123; 127–138.

As the result of his experience with plague in Portugal, de Souza has come to the conclusion that primary septicaemic plague has no real existence; furthermore even in such cases as he describes as "petite adenite pesteuse humaine" a meticulous examination shows that one or several of the lymphatic glands present lesions corresponding to those of a primary bubo. Primary tonsillar plague is, in the author's experience, very rare and is only carried by contagion from person to person, the origin of infection being another individual suffering from tonsillar or pneumatic plague. Tonsillar plague can also be derived from a primary cervical bubo by direct lymphatic contiguity, or by means of a blood stream infection.

He has had reason to change the view he held formerly, in common with WILM and others, regarding the occurrence of primary intestinal plague. He now appears to be in entire agreement with the Advisory Committee for Plague Investigation in India, and does not consider that there is any unequivocal evidence of the existence of primary intestinal plague in man.

"I have sometimes observed in murine epizootics in the Island of Terceira, the anomaly of primary retroperitoneal buboes. . . . I have never observed mesenteric buboes among the island rats, but on the contrary I have seen retroperitoneal buboes, without relation to the intestine. I am at one with the Advisory Committee, in that the rat is not infected spontaneously by means of the digestive tube." R. St. J. B.

di MATTEI (Eugenio). **L'episodio di peste dell' autunno del 1914 in Catania.** [The Occurrence of Plague in Catania in the Autumn of 1914.]—*Malaria e Malat. d. Paesi Caldi.* 1916. May–June. Vol. 7. No. 3. pp. 160–191. With a map.

This is an account of a small outbreak of plague which occurred in Catania in the autumn of the year 1914. The disease was probably introduced from Libia by means of infected ship's rats, as cases first appeared in the vicinity of the customs house, which is described as being dirty and unhygienic. On subsequent investigation, large numbers of dead rats were found in the custom house buildings and along the docks. In all nineteen cases of human plague occurred. Of these 14 were males, with a mortality of 64·3 per cent., and five females with a hundred per cent. mortality. In the first group, one case was carbuncular (one death), nine were bubonic (four deaths), and four septicaemic (four deaths); in the second group two were bubonic and the remaining three, septicaemic. R. St. J. B.

RAGAZZI (Carlo). **Sul significato di alcuni casi di peste a decorso anomalo.** [The Significance of Some Cases of Plague of an Anomalous Course.]—*Pathologica.* 1916. May 15. Vol. 8. No. 181. pp. 159–162.

An account is here given of five cases of atypical plague which occurred during the plague epidemic in Bengazi in 1914–1915. One case, which occurred in a European, resembled in some respects Pestis minor and in others ambulatory plague. On admission the patient's temperature was about 38° C. He suffered from headache and pain in the right side; his general condition was satisfactory. A soft infiltrated swelling was observed on the right side in the nipple line at the sixth intercostal space. The overlying skin was reddened but not adherent and lymphangitis was not present. The swelling was aspirated and a drop of blood-stained serum obtained for examination. The fluid was positive for *B. pestis*, both by direct examination and by culture, such cultures being of full virulence. The fever subsided by lysis in three days and in eight days more the swelling disappeared without suppuration. The other cases showed an unusual condition, in that a marked degree of oedema was present. One case gave a picture of axillary adenitis accompanied by a vast serous oedema on the left side of the thorax. There was moderate fever and the patient was up and about till the last phase of his illness. He died suddenly on the 5th day without any change in the local conditions. Examination of the serous exudate was positive for *B. pestis*.

R. St. J. B.

CONNOR (F. Powell). **Eusol and Plague. A Suggestion.** [Correspondence].—*Indian Med. Gaz.* 1916. Feb. Vol. 51. No. 2. p. 73

The author has already drawn attention to the value of intravenous injections of Tinct. Iodi in the treatment of plague. By experimenting on dogs, however, he has found that Tinct. Iodi thus inoculated caused a great deal of irritation, unless given in very small doses. Eusol, which has been used successfully in cases of septicaemia, is extremely well tolerated by the blood and tissues, and the suggestion is here thrown out that the subcutaneous injection of eusol might be used with advantage in the treatment of plague patients. R. St. J. B.

GENEESKUNDIG TIJDSCHRIFT VOOR NEDERLANDSCH-INDIË. (Bijblad van het). Vol. 55. No. 2. pp. 1–90.—**Dienst der Pestbestrijding verslag ever het Tweede Kwartaal 1915.** [Report of the Plague Eradication Service for the Second Quarter of 1915.]

These reports contain the observations of the Java Plague Eradication Service on the incidence and methods of combating plague during the second quarter of the year 1915. The matters dealt with, which are for the most part of purely local interest, include reports on the work of the Investigation and Clinical Service, the Disinfecting Service and the Transport and Building Services. During the period under consideration, 673 cases of plague occurred of which 143 were of pneumonic plague. The figures for the corresponding quarter of the four previous years were 1,328 (35 pneumonic cases), 291 (two pneumonic cases), 2,023 (five pneumonic cases), and 3,843 (193 pneumonic cases), so that although the incidence of the disease was considerably less than in the years 1911, 1912 and 1913, the proportion of pneumonic cases to total cases was higher in 1915 than in any of the previous years.

The work of the disinfection service was of a very onerous character and included the treatment of 886 wagons laden with rice, dried fish, skins, cassava, copra, etc., with sulphur dioxide gas. A considerable amount of rat-proofing and demolition of building was also carried out; in the latter connexion especial attention being paid to the proofing of the eaves, floors, dead spaces between walls, wainscots, hollow bamboo structures and fire-places.

An interesting report by VAN LOON is given on a small epidemic of pneumonic plague which broke out in Beereug in April-May 1915. Seven patients died and the remaining six apparently recovered.

R. St. J. B.

FLU (P. C.). **Eenige opmerkingen naar aanleiding van het 1e kwartaalverslag 1915 van den dienst der Pestbestrijding.** [Some Observations relative to the Report of the Plague Eradication Service for the 1st Quarter of 1915.]—*Geneesk. Tijdschr. v. Nederl.-Indië.* 1916. Vol. 56. pp. 196–222. With a map.

In this communication the author criticises some of the conclusions arrived at by the Java Plague Eradication Service in the early part of 1915. He is of opinion that the efficacy of proper methods of disinfection had not been sufficiently taken into account, and while fully admitting the great utility of demolition, rat-proofing of buildings and so forth, he insists upon the primary importance of sulphur dioxide or hydrocyanic gas disinfection, carried out under skilled supervision.

The methods suggested are essentially those advocated in a previous communication [see this *Bulletin*, Vol. 5, p. 400], in which the covering over of the building required to be disinfected, with a sail impregnated with impervious material was first suggested. The sulphur fumigation should be continued for three hours when even the fleas hidden in the hollow bamboo frame work of the house will be found dead. Some times, however, fleas which are on the ground may escape the action of the sulphur dioxide gas, and it is therefore useful to swab the floor with an antiseptic, such as "phenico," or cleanse it thoroughly with carbolic or formalin soap. If hydrocyanic gas be used instead of sulphur dioxide, the walls, floors, etc., must be washed afterwards with a disinfectant.

Bad results in disinfection work are due to (*a*) indifferent disinfection carried out by unskilled or improperly supervised workmen; (*b*) the use of crude or "grey" sulphur, which burns slowly and badly and does not generate sufficient gas on combustion; (*c*) too short a time taken for the complete disinfection of premises. R. St. J. B.

KITANO (Toyojiro). **The Employment of Rat Poison as a Measure for Preventing and Exterminating the Plague.**—*Amer. Jl. Trop. Dis. & Prevent. Med.* 1916. June. Vol. 3. No. 12. pp. 627–659.

The employment of rat poison in Japan as a means of combating plague seems in the past to have been attended with indifferent results. This is attributed to the use of improperly prepared poison, to indifferent methods of distribution and to the use of insufficient quantities.

From the author's experiments he has come to the conclusion that the use of phosphorus in the preparation of rat poison is the most effective, and after this arsenic; sulphnal and calcium sulphate, on the other hand, have not proved effective in his hands. In one series of experiments, mice and rats were placed in separate boxes, containing (*a*) sulphnal, barley and flour mixture; (*b*) sulphnal, buckwheat and flour; (*c*) calcium sulphate and flour; (*d*) arsenic mixture with rice; (*e*) arsenic mixture with wheat flour; and (*f*) phosphorus soaked in bread. 27·2 per cent. of the rats experimented with took the arsenic poison, 72·7 per cent. took the phosphorus, while not one of them took either of the other two poisons. With regard to mice, 33·3 per cent. took the arsenic compound and 37·2 per cent. took the phosphorus compound; 7·8 per cent. died of sulphnal poisoning and 1·9 per cent. from the effects of the calcium sulphate. To obtain the best results large quantities of poisoned bait should be used. During the plague epidemic in Kanagawa-ken in 1913–1914 the author enforced the distribution of rat poison in large quantities, as many as fifty pieces to each house, thirty being arsenic and twenty phosphorus, the former being placed in the ceiling under the roofs and the latter under the floors of the ground stories. The poison was allowed to remain *in situ* for twenty days; after this period the poison started to deteriorate. In all, four million pieces of rat poison were distributed among the 80,000 houses in the city, and this was repeated thirteen times. Only three cases of poisoning occurred among human beings, one being a case of suicide and the other two children who mistook it for some kind of cake. These methods of intensive rat poisoning appear to have been very

effective in Yokohama. During the five years ending 1913, a yearly average of 280,000 rats were bought up by the municipal authorities. In 1914, though the price was raised and prizes were offered, the number brought in amounted to but 130,000, which shows that the rats had greatly decreased in the city, and proves that the employment of rat poison for their extermination is a more effective measure than other methods hitherto resorted to.

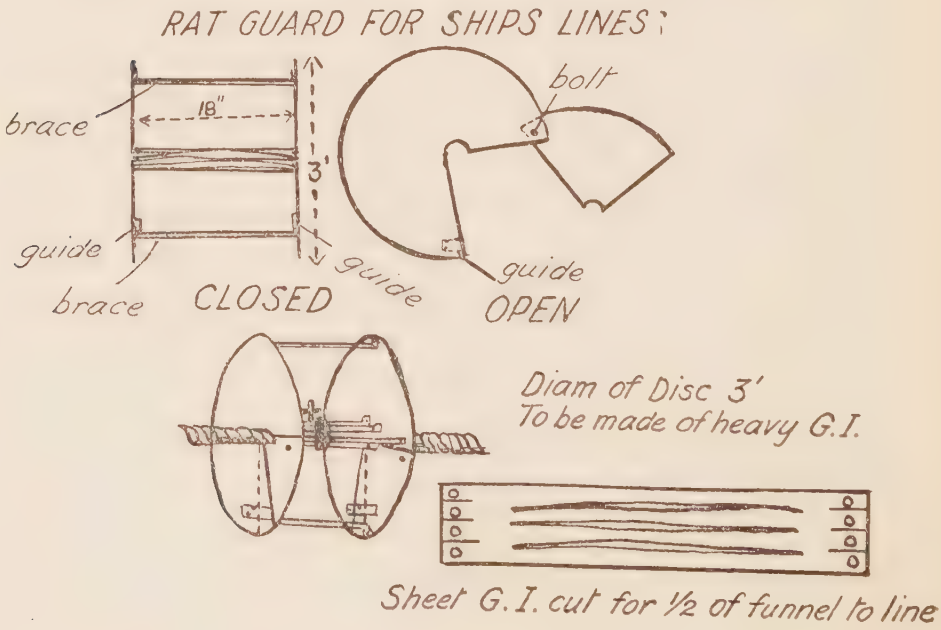
Method of preparing phosphorus poison :—

Place the phosphorus in a double boiler containing sesame oil, keep at a temperature of 44° C., and stir the contents well until all the phosphorus is melted. Then stir in flour, being careful to keep up the temperature. If the compound gets too thick add more oil. Keep stirring, being careful to avoid the formation of lumps, until it is just of a fit consistency to spread on bread. The bread is cut into pieces, placed in an earthenware bowl and the phosphorus compound poured on. The whole is then stirred round, so that the poison adheres evenly to every piece of bread. It is then transferred to a wooden vessel containing flour, with which it is covered. R. St. J. B.

MANNING (H. M.). **Design of an Improved Rat Guard.**—*U.S. Public Health Rep.* 1916. Apr. 7. Vol. 31. No. 14. p. 880.

"This rat guard is made of two disks of galvanized iron 3 feet or more in diameter, joined by four rods or braces of galvanized iron and a funnel made of sheet galvanized iron.

"Each disk is made up of two segments as shown in the diagram, or the disks can be cut as in the Fox rat guard, and joined on one side by a bolt that acts as a hinge, a socket being provided to lock the two segments on the other side. The two disks are joined at the centre by a funnel made of sheet iron. The funnel is made up of two halves, one of which joins on the one side the two large segments of the disks and on the other the smaller segments. The central part of the funnel has long segments cut out as shown in the diagram.



"After closing the guard over a ship's line, the central part of the funnel is tied to the line by a small piece of rope. This fastens the rat guard to the ship's line so that it cannot slip and completely closes the funnel and locks the two halves of the rat guard.

"The advantage of this rat guard is that it is always at right angles to the ship's line, and it would take considerable force to deform it or to flatten it out so that a rat could easily get over it. Also this guard is easily stored away without any danger of damaging it."

R. St. J. B.

PIERCE (C. E.) & CLEGG (M. T.). **Strychnine Sulphate. Its Effect on Californian Valley Quail.**—*U.S. Public Health Rep.* 1915. Dec. 10. Vol. 30. No. 50. pp. 3601–3604.

One of the best methods in use for the destruction of the Californian ground squirrel (*Citellus beecheyi*) is the application of poisoned barley over the infected land during the dry season. Squirrels take to this grain readily, while birds are not particularly attracted to the barbed grain, the spines not being removed in the cleaning process. The following method of preparation is recommended :—Dissolve one ounce of strychnine sulphate in hot water and thicken with starch to the consistency of thin soup (about one pint). Dissolve one ounce of bicarbonate of soda in half a pint of hot water and add a little at a time to the poisoned starch till effervescence ceases ; then add two ounces of "corn syrup (karo or equal)" and one drachm of saccharine, mix well and apply to the grain, stirring constantly until the strychnine is evenly distributed throughout, and the grain is thoroughly dry. The bitter taste of the strychnine is concealed for several minutes and the squirrels may have placed considerable quantities in their cheek pouches before any bitterness is noticed. By this time sufficient strychnine has been absorbed through the mucous membranes of the cheek pouches to kill the animal.

Californian Valley quail, on the other hand, may be fed, under quite natural conditions, on relatively large quantities of strychnine without showing toxic symptoms—4 milligrams per 100 grams of body weight being the minimum lethal subcutaneous dose ; 0·09 milligrams per 100 grams body weight producing convulsions in the case of the ground squirrels. Nineteen grains of barley (containing 2–7 milligrams of strychnine sulphate) when retained in the pouch of ground squirrels proved fatal.

R. St. J. B.

JOHNSON (J. Pratt). **Prevention of Plague. Anti-plague Inoculation.** —*S. African Med. Rec.* 1916. Feb. 26. Vol. 14. No. 4. pp. 51–53.

The use of a prophylactic vaccine prepared from young agar cultures is here recommended in preference to the ordinary "Haffkine's prophylactic" which is obtained from broth cultures. Broth culture vaccines contain non-specific toxic substances arising from the growth of the microbes in the bouillon, and the local and general action observed among the inoculated is largely due to their presence ; the reaction caused, on the other hand by the employment of agar cultures is almost entirely due to the essential bacterial constituents of the vaccine.

The vaccine in question is advocated and supplied by the Clinical Research Laboratories, Johannesburg.

"The vaccine is supplied in single doses in 1 cc. ampoules, or in bulk in 25 or 50 doses in coloured bottles with paraffined rubber caps. These should be well shaken up before use, and in the case of the ampoules the neck should be broken off, and the ampoule inverted over the sterilised needle of the syringe, and the contents of the ampoule withdrawn into the syringe. In regard to the bottle, the paraffined rubber cap should first be swabbed over with iodine, and a sterilised needle of a 1 cc. syringe, plunged through the cap. One cc. may then be withdrawn by inverting the bottle and slowly drawing out the piston. After use the puncture should be sealed by rubbing over the cap a probe or pair of forceps sufficiently heated to melt the wax. On no account should the cap be removed.

"The dose for adults is 1 cc., the dose being correspondingly decreased for children, and for infants a dose of ·1 cc. is recommended. The requisite dose should be inoculated into the subcutaneous tissues in the subclavicular region, preferably late in the afternoon or evening; it is advisable to arrange that for 24 hours after inoculation as much rest be taken as possible. In view of this fact, it is convenient, in many cases, to carry out inoculation on Saturday afternoon or evening.

"A second inoculation of a similar dose at the end of one week is strongly recommended, and the inoculation of a third similar dose, after an equal interval, is advantageous."

The general reaction is slight, the temperature rising 1 or 1½ degrees, and the local reaction is by no means as marked as with Haffkine's prophylactic and disappears in a couple of days.

R. St. J. B.

Mitchell (J. A.) & Robertson (G. W.). **A Note on the Transmission and Examination of Plague Specimens.**—*S. African Med. Rec.* 1916. Mar. 11. Vol. 14. No. 5. pp. 71–72; and *Jl. Trop. Med. & Hyg.* 1916. July 1. Vol. 19. No. 13. pp. 153–154; and *Lancet.* 1916. Apr. 29. pp. 932–933.

The use of Broquet's solution (neutral glycerine 20 cc., distilled water 80 cc., calcium carbonate 2 grammes) as a medium for the preservation of plague material during transmission to the laboratory, has not been attended with success in South Africa. The plan usually followed was to cut cubes of the suspected tissue (about an inch square) from the liver, spleen, etc., and to forward them in wide mouthed bottles of solution. The solution effectively prevented putrifaction, but it rendered smears from the sections much more difficult to fix on the slides. The best results were obtained by using the central parts of the cubes, but it was found that inoculations gave negative results in several cases in which there were strong microscopic, clinical or epidemiological reasons for suspecting plague.

"Subsequent experience fully confirmed the suspicions originally aroused. In one recent case, cubes of tissue obtained *post mortem* from a native child, despatched from Queenstown to Capetown on 5th June, 1915, in Broquet's solution, gave negative results after inoculation into two guinea pigs on 8th June, whereas a guinea pig inoculated with the fresh material at Queenstown on 5th June gave a positive result, dying of typical plague on 11th June.

"It is clear from Dr. Broquet's original paper that stronger solutions of glycerine have an undoubted effect in devitalising the plague organism. He states, however, that a solution of 20 to 25 per cent. of glycerine prevents the growth of other germs and preserves the virulence of the plague bacillus for eight or nine days, or, with the addition of calcium carbonate, for 13 days, but that the virus is attenuated, as shown by the lengthening of the period between inoculation and death of inoculated guinea-pigs. We are unaware whether Dr. Broquet's experiments were carried out at the low temperatures of a Manchurian winter, but in any case they are certainly not borne out by our experience in the warm climate of South Africa, which has been that transmission in the 20 per cent. glycerine solution, even for three or four days, markedly reduces or even entirely destroys the virulence of the plague organism for guinea-pigs, and is thus apt to render the examination of material so transmitted useless or even misleading."

R. St. J. B.

SLEEPING SICKNESS.

NYASALAND PROTECTORATE. **Sleeping Sickness Diary.** [H. HEARSEY, Principal Medical Officer.]—Pt. 25. 12 pp. Zomba: Printed by the Government Printer.

This instalment of the diary is dated 31st December, 1915, and is signed by Dr. HEARSEY, P.M.O. He states that during the year investigations have been confined to the Proclaimed Area in the Dowa District and that 29 cases have been found, 25 in the Proclaimed Area. Histories of these cases are given, the last being numbered 240. Most of the infections were detected shortly before death. The following case is of special interest and recalls one published in Part 23 of the Diary [this *Bulletin*, Vol. 4, p. 351]:—

"*Case No.* 218.—Sapitidwa, an elderly female of Kabwabwa village, Dowa district. A blood film was made on the 23rd March and examined while travelling, with a negative result. On going over old films on the 18th April a trypanosome was found in this film, and after a long search, a second one. On examination she appeared perfectly well and stated that she had only been ill for two days when the film was made; since then she has been at work. Two fresh films were examined for about an hour but no trypanosomes were found; a permanent preparation was then made but no trypanosomes have been found in it. The glands on the left side of the neck are shot-like; on the right side none can be felt. She is well nourished and active; T. 99°, P. 48, and appears to be in excellent health. Her blood (both thick and thin films) has been periodically examined, with negative results, and she has maintained her good health. When visited at the end of December, that is to say nine months after the film showing two trypanosomes had been taken, she seemed perfectly well, and a film made that day and subsequently examined at leisure was negative. On the 24th December, 1 cc. of her blood was withdrawn and citrated and brought up to Kasu where it was inoculated into a healthy monkey, with negative result."

During the last two months of the year Dr. DAVEY carried out some experimental work, starting a transmission experiment with bugs and inoculating ten monkeys with the blood of ten apparently healthy natives in the area. The results to date were negative. A free-shooting area was opened in the Marimba district, the holders of permits to take blood smears from all animals killed. DAVEY has examined 25 of these and the results are tabulated. Trypanosomes were found in two eland and two roan antelope, or 16 per cent. It is pointed out that the Sleeping Sickness Commission found 31·7 per cent. infected in a part of the same area. [This Commission found 57 wild animals harbouring trypanosomes believed to be pathogenic out of 180 examined. The blood was in each case inoculated into a goat, a monkey and a dog, and thick as well as thin smears were searched.]

A. G. B.

JOJOT (Ch.). **Note sur la lutte contre la maladie du sommeil au Cameroun 1913-1914.**—*Bull. Soc. Path. Exot.* 1916. May. Vol. 9. No. 5. pp. 303–305.

Owing to the conclusion of the treaty of November 1911, whereby the basin of the Upper Sangha was handed over to Germany, a Mission, well equipped both in personnel and appliances, under Dr. KUHN, came into existence in Cameroon in 1913. It was divided into two

parties, one of which worked on the upper course of the river Njong to the east of Jaunde, the other on the Mambere (Upper Sangha). Many curative injections were given and clearings made. A rigorous passport system came into force. All this was interrupted by the war, which has caused migrations of tribes and movement of large columns of armed natives and of porters from French and Belgian Congo. Now that military operations are over it will be necessary to deal with this fresh danger. A. G. B.

DANIELS (C. W.). **Eye Lesions as a Point of Importance in directing Suspicion to Possible Trypanosome Infection.**—*Ophthalmoscope.* 1915. Vol. 13. pp. 595–597.

Dr. Daniels draws attention to the significance of eye lesions as a sign of trypanosomiasis, having regard to the importance of early treatment. He gives seven grounds for suspecting this infection, amongst them "orchitis (often absent throughout)" [this is usually considered a rare accompaniment]. Eye lesions, being painful, cause the patient to get medical advice. A positive Wassermann may be obtained. "The eye lesions are essentially a toxic iridocyclitis; with this there is a varying amount of keratitis, circumcorneal congestion, conjunctivitis, and photophobia, which may be severe or trivial." Deep oedema of the lower eyelids is also noted. He refers to his paper on recurring keratitis in a dog, caused by human trypanosomes [*Sleeping Sickness Bulletin*, Vol. 3, p. 273]. The following table shows strikingly the high proportion of patients with eye lesions :—

	Cases.	Deaths.	Eye lesions.	Percentage with Eye lesions.
Rhodesian Cases	6	6	5	83·3
Nigerian Cases	10	3	4	40·0
Uganda, Congo, and other parts of Tropical Africa	16	3	3	17·8
Total	32	12	12	37·5

In four cases it was the eye lesions that led the patient to seek medical advice. A. G. B.

BLIN (G.) & KERNÉIS (J.). **Note concernant le premier cas de maladie du sommeil constaté chez un Européen en Guinée Française.**—*Bull. Soc. Path. Exot.* 1916. Apr. Vol. 9. No. 4. pp. 231–234.

In August 1914 the patient had a "bouton," a sort of blind boil, on the left leg with marked oedema and fever. The swelling was incised but no pus came out. Shortly after there appeared patches of redness over the leg and body so that the diagnosis of syphilis was considered. Increasing loss of strength and weight followed. In November there was loss of sexual desire and Kerandel's sign, which persisted for seven months. Headaches became frequent. On admission to hospital in March 1916 there were patches of redness all over the body, in some places annular, in others S-shaped. The skin of the left thigh was thickened and measurement showed the left lower limb to be larger than the right. A search for the embryos of *Filaria nocturna* was

negative. The glands of several groups were enlarged and trypanosomes were obtained from the juice of one in the neck. It is believed that the patient was infected at Mamou, which is known to be a centre of sleeping sickness, and this is the first recorded case of infection in a white man in French Guinea. Injection of atoxyl produced a speedy amelioration. A. G. B.

LAMBORN (W. A.). **Third Report on Glossina Investigations in Nyasaland.***—*Bull. Entom. Res.* 1916. May. Vol 7. Pt. 1. pp. 29–65. With 11 figs.

The author has completed his survey of the distribution of *Glossina morsitans* in the areas described by SHIRCORE as "primary centres 1 and 2." As in the case of the other primary centres he had "not been able to find that the fly is sufficiently localised, even when the dry season is far advanced, as to render feasible any attempt to control it by prophylactic clearing of the bush [cf. this *Bulletin*, Vol. 6, p. 174].

Parasites.—*Mutilla glossinae* Turner has been bred from pupae of known history, i.e. not subjected to other parasites, and thus has been indisputably proved to be a direct parasite. The pupa is attacked chiefly in the later stages. Breeding experiments have been conducted on a large scale. Up to the 6th October 470 pupae subjected to female Mutillids had yielded a total of 173 of the parasites, giving a percentage of about 36 and a balance of 114 pupae still remained. The examination of 9,285 pupa cases found between April and June, from the same locality, shows that 353 had been parasitised, a percentage of rather over three, and later figures show a percentage of 6·3. It is noted that the length of time occupied by the Mutilla in the development in the tsetse pupa varies considerably, leading the author to suspect that emergence may be determined possibly by climatic changes. With the advent of the dry season there has been a remarkable increase in the numbers of *Mutilla glossinae* that have emerged from pupae from Monkey Bay in the author's possession, so that "it is not a little remarkable that only two parasites, one a Mutillid and the other a Bombyliid, have emerged from pupae obtained within the Proclaimed Area."

A second Mutillid parasite has been obtained at Monkey Bay; it is described elsewhere in this number. With regard to *Syntomosphyrum glossinae* Wtrst., evidence has been obtained that these insects are hyper-parasitic on *Mutilla glossinae* and that the Mutilla may be attacked at any stage in its development, whether as larva or pupa. Out of 9,285 empty pupa cases found about 3 per cent. showed the small round opening [see this *Bulletin*, Vol. 7, p. 284]. An account is given of the bionomics of another hyper-parasite, *Eupelminus tarsatus* Wtrst. Some large Chalcids, species of Stomatoceras, emerged from pupae in the Monkey Bay vicinity between April and June. The precise relationship of these to *Glossina morsitans* is still undecided.

After a discussion of the relationship of the fly to the larger animals the author goes on to—

Artificial Breeding Places.—A large number have been constructed. Details are given. They have been made by felling trees at intervals both near Monkey Bay and in the Proclaimed Area. In the former

*The second Report was summarised in this *Bulletin*, Vol. 7, p. 110.

they covered an area of two square miles. Here the great majority of the natural breeding places have been eliminated. In some instances soil was brought in. The fallen trees were easily disposed of, the portable timber being piled round the large trunks and ignited. In nine of these artificial breeding places made in August, 59 living pupae and 39 cases were obtained in January. The author writes, "it would almost appear as if the flies had exercised a judicious selection in their choice of places for the reception of their pupae, preferring artificial ones which fulfil presumably all their requirements to the natural ones, many of which cannot in respect of drainage, protection from sun and rain, etc., be as wholly satisfactory." Thirty artificial breeding places in another area yielded 98 pupae and 34 pupa cases. He thinks that the possibility of checking the flies through artificial breeding places has been established.

Effect of Bush Fires on the Flies' Distribution.—The result of a fire near the road running west from Domira Bay was a marked diminution in the number of flies in the burnt area, but on camping at the spot on the banks of the river where the author had stopped previously in comfort for weeks, he was so beset by flies in his tent that he found it necessary to move. These flies are considered to have come in partly as the result of the fires and partly owing to the driving away of the game; "but, apart from these flies, there were pupae enough under logs untouched by the fires soon to repopulate the burnt area." The fires are so fleeting that they do not do more than char most of the logs which form so large a proportion of the breeding places. He does not think that systematic burning of the grass is likely to be of value for controlling the fly. Where fires have been extensive and the game driven away, the newly emerged fly can subsist on warthog, which grubs up roots.

Proportion of the Sexes.—It is well-known that the readiest method of obtaining tsetses is for the collectors to catch them off each other, and in these cases females of *G. morsitans* invariably bear a small proportion to males. Different figures are obtained "if captures of flies which have settled near to the possible host are included." As the easiest method of securing these an umbrella was carried and captures were made by boys off one another and off the umbrella. The results are tabulated. The proportion of females captured off the umbrella worked out at 35 per cent. (343 ♂, 189 ♀), whereas when captures were effected in the usual way the percentage was 10 (331 ♂, 36 ♀). During the heat of the day the numbers of *morsitans* are much diminished. The author sought for the missing flies and found them, females in greater proportion, on the larger trees, baobabs in particular. The females are to be seen in the recesses between the buttresses and in the hollows and fissures of the bark of the older trees. It was also obvious that a far larger number of the females caught on the trees had recently fed than of those captured otherwise. These points are illustrated by a table. The interpretation of the disparity of the sexes in captures is given thus:—

"The males, most of which are already replete, attend man largely to await the arrival of females coming to feed, hence the inequality in numbers in ordinary captured series; for whereas the males have a double object, the females have that of feeding only. On arrival the female may be secured by one of the males, or if pregnant, may be driven away in its endeavours to escape their attentions, then settling near by and renewing-

its attempts to feed from time to time. Having fed, it retires to the shaded recesses of large trees or to breeding places more or less remote from where the flies happen to be massed at the time, its object being to keep free from the males. As there is so great an increase in the numbers of the females taken off the trees and by other special collecting methods, it is practically certain that the sexes exist in the same area in equal numbers in accordance with the expectation from laboratory results."

Attempts were made to catch the flies, on these trees, by means of brown paper smeared with bird lime in the recesses and by thatched shelters bird-limed on the inner side, but with no success.

The breeding season.—In October, when the rains were about due, the pupal period averaged about 21 days; earlier in the dry season it may last certainly as long as 10 weeks. This variability doubtless enables the race to tide over the trying period of the dry season when the conditions of life must threaten the existence of the imagos.

A. G. B.

LLOYD (Ll.). **Report on the Investigation into the Bionomics of *Glossina morsitans* in Northern Rhodesia, 1915.**—*Bull. Entom. Res.* 1916. May. Vol. 7. Pt. 1. pp. 67–79. With 1 plate and 2 figs.

In July 1914 the author selected a base camp near Kashitu station, mid-way between Broken Hill and Ndola and decided to let his investigations "centralize round" *Mutilla glossinae*, recently found on the Kafue river [this *Bulletin*, Vol. 6, p. 175].

Density of Fly in Relation to Game.—In Kashitu game is "not particularly uncommon" but the animals "do not return to the same spots day after day to feed. . . . The consequence is that the fly is very hungry and both sexes swarm round any person passing through and are all eager to feed. This eagerness to feed gives one at first a false impression of the numbers of fly in the area compared with fly areas in which game is numerous and little disturned." Moreover where game is very plentiful the proportion of female flies is much smaller than where it is not plentiful. Table I. shows this :—

TABLE I.

Comparing the Catches of Fly in relation to the Amount of Game in an Area.

Locality.	Game.	Period.	No. of catches.	Total ♀ flies.	Total ♂ flies.	No. per net per day.		Percentage of ♀ flies.
						♀	♂	
Nawalia ..	Very plentiful.	Sept. to Dec.	46	727	4849	3·2	21·0	13·0%
Ngoa ..	Very plentiful.	Dec. to July	79	1315	—	4·2	—	—
Kashitu ..	Not plentiful.	Oct. to March	41	1219	1722	7·9	10·5	41·5%

The pupa collecting also shows that the fly isl ess numerous than it appears to be in the areas where game is scanty. Another table illustrates this. At Ngoa a collector could find four times as many in a day as at Kashitu. Six instances are given showing the mutual relations of the prevalence of game and of pupae on the one hand, and the hunger of the fly on the other. In one place "in four collections 989 pupae and 1,325 cases were taken. . . . Very few tsetse were seen and these were not hungry." In another place deserted by game, "one search yielded ten pupae and 71 empty cases. A great deal of fly was seen and all the workers were badly bitten." A table includes these and similar figures. As the author writes, "by comparing the numbers and behaviour of the fly in areas where game is plentiful and those in which it is scanty, some hints may be obtained as to what would be the result of the much desired experiment in game destruction."

Destruction of Pupae by Bush Fires.—Of the pupae collected the mortality was much higher in those from the areas over which fires had passed at Ngoa. In unburnt areas it ranged from 10 to 18 per cent. (1,578 pupae); in burnt areas from 28 to 30 per cent. (2,041 pupae). The excess of mortality is attributed to the fire.

Breeding places.—Of 700 examined all agree in that very close to each is some "relatively dark hiding place for the flies." Pupae having been found in narrow hollows in the ground, "it is only reasonable to suppose that [the flies] also breed in the fissures in the earth which are so plentiful in the Luangwa Valley." In less than 100 yards of sand in a stream bed above and below a waterfall 717 pupae and 92 cases were taken in three mornings. Attention is drawn to the similarity of these breeding spots to those of *G. palpalis.*

Parasites.—Six species have been met with. *Mutilla glossinae* is the one most generally distributed. The larva is described and figured. When fully grown it spins a very strong papery cocoon and then is apparently independent of the tsetse puparium. The mature insect bites a round hole in the cocoon and puparium for emergence, usually at the anterior end. The adults were fed on jam. This parasite is "generally distributed in *morsitans* areas in N. Rhodesia." At Chutika 7 per cent. of 1,164 pupae were parasitised, at Nawalia 13 per cent. of 155 (a photograph is given of the place where these were found), at Ngoa 0·5 per cent. of 2,500. Over most of this last area the parasites were not found. Three other hymenopterous parasites met with were *Anastatus viridiceps* Wtrst., *Stomatoceras micans* Wtrst., and *Syntomosphyrum glossinae* Wtrst. Two species of dipterous parasites were met with, one being *Villa lloydi* Aust. The larva and pupa of this are figured.

Source of food.—"Nucleated red cells have been found with tolerable frequency in *G. morsitans*" and the flies have been seen feeding on a ground hornbill at liberty in the camp, this being the first observation of the kind. Wild flies put on the shaved bellies of rabbits filled themselves with clear fluid, which is thought to have been peritoneal.

The Importance of Compact Villages in Fly Areas.—The cases of sleeping sickness found in the Luangwa valley have been partly centred round four villages, three of which are known to the author. They "differ from the generality of the Luangwa villages in that they are shady and scattered." They are described.

"Each of these places where the local epidemics have occurred contains the three requisites for the life of the fly, food, shade and potential breeding places, while most of the Luangwa villages lack the two last of these. Lack of shade probably accounts for the fly leaving the usual type of village. In these shady places the natives are always liable to come into much the same relation to *G. morsitans* as are natives in *palpalis* areas to *G. palpalis*, by repeatedly passing the shady spots where the flies lurk. An infected fly brought into a village of this type or to one of the shady water-holes could easily remain long enough to infect a number of people. The writer does not believe that *G. morsitans* could ever subsist entirely on man, as it is so rarely that a fly obtains a full meal on a healthy person, European or native, but where domestic animals remain, as in the case of each village mentioned above at the time of the epidemic, the fly might be able to breed actually in this unusual type of village. At any rate the shady and scattered nature of the villages where these local epidemics have occurred seems to indicate their cause.

"The epidemics could probably be avoided by allowing no shade in the villages and by making these compact. Two villages should never be allowed on opposite banks of the temporary streams, nor where stretches of shaded sand are left by the falling of the water. The clearing of the bush around water-holes in these streams however is a difficult problem, as the water would fail if the shade were removed."

A photograph is given of one of these shady and scattered villages.

A. G. B.

TURNER (R. E.). **On Mutillidae parasitic on** *Glossina morsitans.*—*Bull. Entom. Res.* 1916. May. Vol. 7. Pt. 1. pp. 93–95. With 2 figs.

The male of *Mutilla glossinae* is described from Monkey Bay (LAMBORN) and a new species, *M. benefactrix*, from the same locality is described, with a figure of each sex. This also was bred from pupae of *G. morsitans.*

A. G. B.

STUEHMER (A.). **Ueber lokale ("primäre") Krankheitserscheinungen an der Stelle der Infektion bei der Ngana-Erkrankung des Kaninchens ("Trypanosomenschanker"). Ihre Bedeutung für die Beurteilung des Verlaufes der Kaninchentrypanosomiasis. Uebergang des "primären" in das "sekundäre" Krankheitsstadium (Rezidivstammbildung).** [Local Phenomena at the Site of Inoculation in Nagana of Guinea-pigs. Their Significance in Estimating the Progress of the Infection. Transition from the Primary to the Secondary Stage.]—*Zeitschr. f. Immunitätsforsch.* 1. Teil. Orig. 1916. Mar. 4. Vol. 24. No. 4. pp. 315–335.

The writer refers to STARGARDT's paper on syphilis and trypanosomiasis [see this *Bulletin*, Vol. 4, p. 253] and to the chancre-like lesions which he produced in rabbits by inoculating a small number of trypanosomes into the bulbar conjunctiva. Working in NEISSER's laboratory he repeated STARGARDT's experiments with a strain of nagana, and in a series of 25–30 guinea-pigs obtained cent. per cent. positive results. The trypanosomes came from mice and in the suspension used two trypanosomes were present in each field (Zeiss DD, Compensating Ocular 6). The development and character of the lesion produced, a sharply circumscribed oedematous swelling, is described. In it could be demonstrated crowds of trypanosomes when as a rule they could not be found in the blood or in inoculated animals. The trypanosomes

multiply chiefly in the connective tissue layer immediately under the epithelium and extend into the tissue spaces towards the periphery and the inflammation slowly spreads from the site of injection to the whole of the upper half of the conjunctiva. A few find their way into the cornea itself, causing smoky opacity. Later they are found in the lymph channels. The same result was obtained when the inoculation was made into the skin of the scrotum. The author regards these lesions as similar to those of syphilis and would call the local infection primary trypanosomiasis.

The author then states the following questions as requiring an answer—When does general infection of the body occur ? Can any laws be recognised as to the appearance of trypanosomes in the blood ? How does the body react ? The result of his attempt to answer them is given in the summary.

With regard to serum fast relapse strains reference is made to a paper by Ritz [this *Bulletin*, Vol. 4, p. 265], who differentiated in the mouse 17 such strains, all differing strongly in their immunisation properties. An example is given of a rabbit inoculated in the left side of the scrotum on June 30th, in the left eye July 4th, in the right eye July 7th, and the right side of scrotum on July 12th. Following the first and second inoculations were well-marked local lesions containing trypanosomes. The third and fourth had no result. Trypanosomes were found in the blood on July 4th and 5th and again from July 9th onwards, not in the interval. On the occasion of each inoculation the blood serum was examined for bodies immune to the original strain.

The author's conclusions are to this effect :—

(1) With the strain of trypanosomes used (Morgenroth's from Ehrlich's Institute) he succeeded every time in producing local lesions on the conjunctiva and the scrotum in rabbits.

(2) Large numbers of trypanosomes were found in the affected tissues and general infection followed after three to five days.

(3) Pathologically the " chancres " are much like the local spirochaetoses of men and animals. In accordance with the nomenclature in syphilis this local trypanosomiasis would be known as " primary trypanosomiasis."

(4) As soon as the local lesion is completely formed the trypanosomes become dispersed in the circulation. Those which first appear there have the properties of the original strain.

(5) There follows a gradual increase in production of antibodies, which reaches its height in 7–8 days. The trypanosomes disappear almost completely from the blood, to become numerous there again about the 9th day.

(6) Thus relapse strain No. 1 is formed. It is distinguished from the original strain by its fastness to the antibodies of the first order and may be called the serum-fast secondary strain.

(7) Owing to the increase of antibodies in the blood reinfection with the original strain succeeds only up to the fourth-fifth day. Once the secondary strain is formed, the original strain ceases to infect.

(8) As soon as the serum-fast secondary strain is formed the so-called late phenomena occur in rabbits, oedema of the genitals, of the lips, ears, etc. These the author regards as " secondaries " [*Sekundärerscheinungen*] because they are produced by the secondary strain.

(9) The "secondaries" cannot present themselves until the trypanosomes by mutation have eluded the action of the antibodies. It is then that the parasites find their way to the body tissues. An interval elapses before the body forms fresh substances protective against the altered trypanosomes. In the meantime the tissues directly affected can keep off the attackers only by inflammatory reaction.

(10) Primary and secondary trypanosomiasis in rabbits forms excellent material for the solving of various therapeutical problems, especially salvarsan dosage. A. G. B.

OFFERMANN. **Ueber die serologischen Untersuchungsmethoden als Hilfsmittel zum Nachweis der Trypanosomenkrankheiten, im besonderen der Beschälseuche.** [Serological Methods of Investigation as Aids to the Diagnosis of Trypanosome Infections, especially Dourine.]—*Arb. a. d. Kaiserl. Gesundh.* 1915. Sept. Vol. 50. No. 1. pp. 1–30.

The conclusions of the author, who is an army veterinary surgeon, may be summarised as follows :—

Sera obtained from healthy rabbits often possess the property of checking haemolysis. This property is not constant ; in some sera it is very evident, in others it is nearly or quite lacking. The author did not meet with it in experiments in which 0·01 cc. of serum or less was used. When rabbit serum is used for complement binding experiments the serum should be tested before infection.

Agglutinins causing agglutination of dourine trypanosomes were not demonstrable in normal rabbit serum. In the serum of rabbits infected with these trypanosomes complement binding antibodies and agglutinins could be demonstrated, but not always simultaneously. Usually the complement binding amboceptors were found before the agglutinins, the first generally 8–9 days after infection, the second 12–13 days. Both occurred in the blood later than the trypanosomes, 4–9 days and 4–22 days later respectively. In time and quantity the occurrence varied with the individual and course of disease. They often diminished, to increase again later, but this phenomenon was irregular. They never disappeared altogether. If the serum was preserved sterile, antibodies could be still demonstrated after many months.

For agglutination fresh trypanosome suspensions must be used. If kept in the ice chest the antigens from these suspensions retain their complement-binding powers for weeks.

Complement fixation and agglutination can be used as diagnostic aids ; the former gives better results.

[A list of references appended does not contain the name of WATSON, who has established the complement-fixation test "as a sure, safe, and specific method of diagnosing dourine" (this *Bulletin*, Vol. 6, p. 382 and elsewhere).] A. G. B.

RODHAIN (J.) & Van den BRANDEN (F.). **Sur la réceptivité de la roussette, *Cynonycteris straminea*, aux différents virus de trypanosomes africains.**—*Bull. Soc. Path. Exot.* 1916. Apr. Vol. 9. No. 4. pp. 234–236.

The authors recall that LAVERAN inoculated a bat of the species *Pteropus medius* with surra with success ; otherwise the bat does not

seem to have been used in laboratories. They themselves inoculated two bats of the species named in the title with rat's blood containing *T. lewisi*; no infection was contracted. Two bats were inoculated with sheep's blood containing trypanosomes of the *cazalboui-vivax* type; no infection. Two bats were inoculated under the skin and one in the peritoneal cavity with blood containing *T. congolense*; no infection. On the other hand, a bat inoculated with guinea-pig blood containing *T. gambiense*, and a second from the first, contracted chronic infections with death after 52 and 68 days.

The bats used for the experiments were infested with Nycteribidae, *Cyclopodia greffi*. The authors thought it possible that *T. gambiense* might undergo some development in the digestive tube of these insects. They first of all dissected 25 to see if they contained flagellates; none were found. They then examined eight Cyclopodia born in the laboratory and placed for periods varying from days to weeks on a bat, the blood of which always contained *T. gambiense*. Trypanosomes showing signs of degeneration were found in the stomach but none in the mid-gut or hind-gut. The conclusion is that *T. gambiense* appears not to undergo any development in *Cyclopodia greffi*.

The paper is dated from the Leopoldville laboratory. A. G. B.

RODHAIN (J.) & Van den BRANDEN (F.). **Action comparative des matières colorantes: tryparosan et trypanobleu et des arsenicaux: salvarsan cuprique, sur les trypanosomes animaux Africains des groupes** *congolense* **et** *angolense* (*cazalboui-vivax*).—*Bull. Soc. Path. Exot.* 1916. Apr. Vol. 9. No. 4. pp. 236–241.

The authors have already reported that tryparosan is the best remedy in the kid for infections caused by trypanosomes of the *dimorphon-congolense* type in Lower Katanga [see this *Bulletin*, Vol. 2, p. 573]. Their present paper comes from the Leopoldville laboratory. They find that tryparosan given by the mouth in a dose of 0·5 gm. per kilo body weight to the sheep, goat, native pig, and guinea-pig makes the trypanosomes disappear after 24 hours. A goat received 13 gm. of the drug in three days without being poisoned. Six experiments are given. Trypanblue has no action on *T. congolense*, as is shown by the results of three experiments. It is well-known, the authors say, that trypanosomes of the *congolense* group are not influenced by arsenicals. They have found that cupric salvarsan also has no action on this trypanosome (two experiments).

In 1911 they showed the susceptibility of *T. cazalboui* (*vivax*) to tryparosan. Two more experiments in sheep confirm this observation. The trypanosome of the *cazalboui-vivax* type had not shown itself susceptible to trypanblue; a lamb and sheep were treated. The conclusions are to this effect:—

1. Tryparosan is the drug of choice against infections produced by the trypanosome of *congolense* type.
2. Trypanblue and cupric salvarsan have no action on *T. congolense*.
3. The trypanosome of *cazalboui* type is susceptible to tryparosan, but not to trypanblue.
4. Cupric salvarsan has appeared to have only a temporary action, almost nil, on the development of *T. cazalboui* infection in the sheep.

A. G. B.

LANFRANCHI (A.). **Opothérapie et opoprophylaxie dans les Trypanosomiases.**—Communication faite à la Société de Pathologie Comparée. 1914. Apr. 7. 7 pp.

The conclusions reached are to this effect :—

(1) The inoculation of extract of dog spleen into dogs at the height of infection with *T. brucei* does not destroy the trypanosomes present in the blood, does not lead to a diminution in their number, and does not produce trypanolytic crises.

(2) Repeated inoculations of increasing doses of spleen extract before experimental trypanosome infections (*T. brucei*) make the animals more resistant.

(3) This resistance seems more marked in animals inoculated intravenously.

The second conclusion rests on two experiments, in one of which three puppies so treated survived longer than two controls of the same litter, and in the second of which the treated dog lived 24 days, as against 17 for the control, and in the course of the infection had three trypanolytic crises; in the controls the trypanosomes increased steadily till death. Tables give the salient points of the two experiments.

A. G. B.

LANFRANCHI (Alessandro). i. **Su la possibile trasmissione delle tripanosomiasi animali nell' uomo.** [On the possible Transmission of Animal Trypanosomiases to Man.]—*Bull. d. Sci. Med.* 1915. Vol. 86. Ser. 9. Vol. 3. 18 pp.

ii. **Ulteriori ricerche sulla possibile trasmissione delle Tripanosomiasi animali nell' uomo. Le reazioni biologiche nelle tripanosomiasi umana ed animali nella identificazione dei virus.** [Further Researches on the Possible Transmission of Animal Trypanosomiases to Man. The Biological Reactions of Human and Animal Trypanosomes in Identifying the Virus.] Notes I, II, III.—*Rendiconti d. R. Accad. dei Lincei.* 1916. Feb. 6 & 19. Vol. 25. Ser. 5a, 1 Sem. Nos. 3 & 4. pp. 195–198; 230–234; Apr. 16. No. 8. pp. 601–605.

Professor Lanfranchi, having had the misfortune to infect himself accidentally with one of the strains of trypanosome in his laboratory, instituted the series of researches described in the above papers, using his own serum as the basis of his experiments. The fact of being under treatment with atoxyl at the time was held not to vitiate the results. The trypanosome was either *T. brucei* or *T. evansi*, there being no others in cultivation in the laboratory at the time. In these memoirs it is provisionally distinguished as virus Lanfranchii. Tested by the trypanolytic power of the serum it approximated rather to *T. gambiense* than to *T. evansi* but, in its protective (to laboratory animals), precipitating and complement-fixing powers, it approximated more nearly to the latter.

J. B. Nias.

LANFRANCHI (A.) & VALLA (G.). i. **Dell' azione del siero umano, normale e specifico, su la morfologia dei tripanosomi in rapporto ai metodi tripanometrici.** [The Action of Normal and Specific Human Sera on the Morphology of Trypanosomes, in Connection with Trypanometric Methods.]—*Boll. Soc. Med. di Parma.* 1914. May 2. 11 pp.

ii. **Dell' azione del siero umano, normale e di affetto da tripanosomiasi, su la morfologia del Tripanosoma gambiense, in rapporto ai metodi tripanometrici.** [The Action of Human Serum, both Normal and Trypanosomic, on the Morphology of *T. gambiense.*] —*Ibid.* June 19. 8 pp.

LANFRANCHI (A.) & SANI (L.). **Dell' azione del siero, umano, normale e di affetto da tripanosomiasi, su la morfologia del Tripanosoma evansi, in rapporto ai metodi tripanometrici.** [On the Action of Human Serum, Normal and Trypanosomic, on the Morphology of *T. evansi.*]—*Ibid.* June 19. 8 pp.

LANFRANCHI (A.) & SCOTTI (G. B.). **Dell' azione del siero umano, normale e di affetto da tripanosomiasi, su la morfologia del Tripanosoma rodesiense, in rapporto ai metodi tripanometrici.** [The Action of Human Serum, Normal and Trypanosomic, on the Morphology of *T. rhodesiense.*]—*Ibid.* 1914. June 19. 8 pp.

These four papers are concerned with the measurements of trypanosomes, after subjection to the action of normal and trypanosomic human blood sera respectively. The method employed was as follows. Rat's blood containing plenty of trypanosomes was mixed, in the proportion of 0.20 cc. with 1 cc. of normal human serum, specific serum and normal salt solution respectively, and, after three minutes of contact, the mixtures were injected into the peritoneal cavity of rats. From the blood of these rats microscopic preparations were made, in which the trypanosomes were measured micrometrically. Not very much difference was to be noted in the action of the two kinds of sera, but with the specific there was a tendency towards a reduction of the maximum measurements obtained.

[On account of the amount of detail this series of papers should be consulted in the original by the student.]

J. B. N.

LANFRANCHI (A.). **Su possibile passaggio dei tripanosomi nel latte.** [On the Possibility of the Passage of Trypanosomes into the Milk.] —*Rendiconti d. R. Accad. dei Lincei.* 1916. Mar. 5. Vol. 25. Ser. 5a. 1 Sem. No. 5. pp. 369–373.

Trypanosomes of the four types *brucei*, *evansi*, *rhodesiense* and *gambiense* were injected into bitches that had recently given birth to litters of puppies, in order to see whether infection would take place through the milk. The milk and the blood of the puppies were injected into rats. The results were negative with *evansi*, but, with the other three, transmission was obtained; least decisively so with *rhodesiense*. With the latter, one rat showed infection when injected with milk, but inoculation with puppy blood gave negative results in every instance.

J. B. N.

YAKIMOFF (W. L.) & SCHOKHOR (N. J.). **A propos du *Trypanosoma theileri* au Turkestan russe.**—*Bull. Soc. Path. Exot.* 1916. Apr. Vol. 9. No. 4. p. 229.

By culturing the blood of nine Bovidae in Taschkent on ordinary bouillon in 1913, an infection with *Trypanosoma theileri* was demonstrated by the authors in eight cases. The examination of the peripheral blood of more than 1,000 Bovidae has been negative. At Termese out of 191 preparations of liver smears of Bovidae, one showed a trypanosome of the type *T. theileri.* The extremities, especially the posterior one, were greatly drawn out. The nucleus was central. The flagellar border of the undulating membrane stained well, but the free end of the flagellum could not be seen because of erythrocytes and hepatic cells.

Trypanosoma theileri thus occurs at Taschkent and Termese and probably other places in Russian Turkestan.

H. B. Fantham.

FEVERS IN THE TROPICS.

CAIRNS (P. T.). **Notes on a Number of Cases of Fever, called Sun Fever, Influenza, Ephemeral Fever, Gastric Fever, in Upington and District during the Early Part of 1915, with a Suggestion as to the True Nature of the Disease.**—*S. African Med. Record.* 1916. March 25. Vol. 14. No. 6. pp. 89–91.

During the first three months of 1915 a short fever appeared in an epidemic form amongst the troops in and around Upington. Not less than 251 cases were treated in the No. 7 Stationary Hospital, but there must have been many others to whom no hospital treatment was given.

The greater number of the cases occurred in the dry season preceding the rains. The disease itself had a sudden onset with general pains and severe headache, the pyrexia lasted about three days and the symptoms were very similar to those of the three day fever of Chitral. Relapses are stated to have been common and convalescence was slow. The author discusses the possible etiology and differential diagnosis. There was no evidence to show that water, food, or sun heat was the cause and, though no Phlebotomus flies were found in and around Upington, the author believes that the epidemic was one of Phlebotomus fever endemic in that area.

[There is evidently an interesting field here for an entomological investigation.]

P. W. Bassett-Smith.

PIETROFORTE (Vincenzo). **Un' epidemia di febbricola intermittente tropicale. (Low Intermittent Non Malarial Fever degli inglesi) nell' equipaggio della R. Nave "Piemonte" di stazione nel Mar Rosso.**—*Ann. Med. Nav. e Colon.* 1916. Jan.–Feb. Vol. 22. Nos. 1–2. pp. 5–26. With 9 charts.

The author gives an excellent description of an epidemic of fever which occurred on board the R. Italian ship "Piemonte."

The disease was apparently contracted at Massawa and was so severe that the ship had to return to Italy. It was of the type known to us as non-malarial remittent or low fever. Out of a complement of 180 men 60 per cent. were attacked; of the deck hands 56 per cent., of the seventy stokers and engine room staff 55. The fever either was of an ambulant type lasting about eight days, or persisted four or five months with occasional short free intervals, the pyrexia being of an irregular intermittent character. The incubative period is said to be five days. Bronchial complications were not infrequent and a marked anaemia was produced with some enlargement of the spleen and lymphatic glands. The general condition of the patients was not markedly affected, but convalescence was slow. Residence in the hot climate of the Red Sea was undoubtedly a predisposing cause; mosquitoes, fleas, bugs, and cockroaches were abundant, the latter being possible "carriers"; the author sums up by saying that the disease was epidemic and was spread from man to man but the cause is still unknown. No parasites were present in the blood and serum reactions for typho-colon and melitensis groups were

absent. The disease is very similar to that described by CASTELLANI from Ceylon and India. It is evidently endemic in Africa and it probably produces an immunity both acquired and hereditary. Other cases have been described by VIVALDI in which lymphatic changes were marked, and by LUCATELLO who believes that a perverted internal secretion may be the cause.

P. W. B-S.

RUMMO (G.) & FERRANNINI (L.). **La cura chininica delle febbricole.**—*Riforma Med.* 1915. Oct. 9. Vol. 31. No. 41. pp. 1121–1124. With 1 chart.

A preliminary note on the curative action of quinine in cases of fever was made by RUMMO to the 20th. Congress of the Society of Medicine at Genoa in 1914. The present communication is a continuation of his work, with the assistance of FERRANNINI who carried out the laboratory experiments. The basic hydrochlorate of quinine was found to be most useful for the tests, which were made on members of the typho-colon group and the *M. Melitensis.* An aqueous solution which corresponded to about 3 per cent. of the dry salt or 2·4 of the alkaloid was used, and 1/10 of this added to the broth for the cultures, which were grown for 14 days at 37° C. The inhibitory action on *B. typhosus* was relatively small, that on *B. paratyphosus* A greater, on *B. paratyphosus* B most marked. Sub-cultures of these on to solid agar showed a diminished vitality of the organisms. It is noted that BISOGNA does not consider the conditions of the experiments in vitro analogous to that which would occur in the living tissues and blood. Quinine has anti-pyretic, neuro-cardiotonic and anti-malarial properties but "it is not presumed that the drug has a direct or elective action on the specific bacteria but that its efficacy consists in producing in the blood by its antiseptic and antitoxic action a change which renders this less suitable to the life of the respective micro-organisms."

The clinical research was carried out by Rummo at the Military Hospital, where cases of the fever were common, and of these ten are specially reported. Hypodermic injections of 1 gram to 1½ grams were given daily for 10 days and, if necessary, after an interval of four-five days a second or more courses were administered; in the more chronic cases the drug was given by the mouth. In acute cases of paratyphoid fevers the results were the best and it is pointed out that not only was the fever reduced but the titre of agglutination was also lowered during the treatment. Many patients with chronic fevers of uncertain origin were not benefited at all, the effects appearing to depend to a great extent upon the period when the treatment was started, the more acute forms reacting best.

P. W. B-S.

KAPP (Josef). **Eine eigenartige Epidemie. (Pappatacifieber, Influenze oder Malaria.** [A Peculiar Epidemic.]—*München. Med. Woch.* 1915. Nov. 16. Vol. 62. No. 46. p. 1590.

This is a description of an outbreak of a peculiar fever among a large number of sailors after embarkation [place not stated] at the end of December and in January 1915 following a period of three weeks' rain. It is stated that the crew while employed both on board and

on shore were subject to unusual exertion, this acting no doubt as a predisposing cause. Thirty-three cases were noted and the illness usually lasted at most for ten days. After a period of malaise for two or three days, the fever set in accompanied by headache and pains in the limb muscles, and congestion of the mucous membranes of throat and mouth. There was obstinate constipation, and often catarrh or bronchitis. Generally the fever lasted three days it ended by crisis or lysis in an equal number of cases ; this was marked by profuse sweats. In two cases bradycardia was marked. Herpes of the lips was the only eruption. The epidemic lasted for three weeks and died out without any special precautions being taken. Quinine appeared to give the best results, causing a fall of the temperature in twelve hours. [No mention is made of blood examinations, or the prevalence of mosquitoes or sandflies, but the symptoms point to the disease being phlebotomus fever.]

P. W. B-S.

HILL (R. A. P.). **Diagnosis of Fevers among the Mediterranean Expeditionary Force.**—*Lancet.* 1916. Mar. 4. pp. 504–506.

The author points out that the fevers in which no obvious cause can generally be found belong to one of the following groups, enteric (including typhoid and paratyphoid), malaria or amoebiasis, the possibility of undulant fever, kala azar and tuberculosis receiving due consideration. He states that a blood count is of great importance as a first measure and then a careful examination of a stained blood film which will clear up the diagnosis in many cases. Following these tests must be considered the therapeutic effects of quinine and emetine. A culture from the blood or excreta may of course give positive proof of the bacillary infective diseases, and agglutination reactions in uninoculated persons are useful. [The information supplied can be obtained from any up to date text book. No mention is made of dengue, phlebotomus fever, epidemic jaundice or so-called trench fever.]

P. W. B-S.

LURIE (G. A.). **A Case of Febris Colombensis.** — *Lancet.* 1916. Feb. 12. p. 350.

The case described is that of an Austrian who had been a prisoner in Serbia. He was treated at the American Clinic as an out patient and then in the second reserve hospital.

The fever lasted five weeks and terminated by lysis ; the general symptoms were severe but there was no rash or enlargement of the spleen.

Blood examinations gave negative reactions for typhoid, paratyphoid A and B and undulant fever, but positive results with *B. colombensis* in dilutions of 1/40 to 1/160 and the same bacillus was isolated from the faeces. The irregular reactions with lactose were noticed as described for the type species.

P. W. B-S.

Dengue.

Goldsmid (J. Albert) & Crosse (Walter). **Some Notes on Dengue.**—*Med. Jl. of Australia.* 1916. May 6. Vol. 1. 3rd Year. No. 19. pp. 377–378.

Cleland & Bradley. [**Discussion on Dengue.**]—*Ibid.* pp. 386–387.

(1) The authors describe an outbreak of an intensely contagious fever which occurred at Murwillumbah, New South Wales. This was probably introduced by soldiers from the military camp at Brisbane and was originally believed to have been measles. On 10th February, 1916, it was first definitely diagnosed as dengue and from that date it spread widely, practically to every resident in the town, attacking most of the inmates of houses and hospitals. The onset was always sudden ; the fever, which ran high, lasted from four to seven days and was accompanied by a flushed face, headache, insomnia, some delirium, pains in the back and limbs, a relatively slow pulse, and eruptions both initial and terminal. The former was evanescent, fine, and punctate ; it was present on the elbows and knees and was also found on the mucous membranes of the mouth ; the second eruption was polymorphic, papular or dark red and blotchy, occasionally urticarial. There were no severe complications and there was no mortality.

(2) Dr. B. Cleland visited Murwillumbah and collected both *S. fasciata* and *C. fatigans* mosquitoes there ; these he fed on himself at Tweed Heads and at Sydney. Seven days after he had been bitten he developed dengue. These mosquitoes had fed on patients at Murwillumbah and were allowed to bite persons at Sydney, none of whom contracted the disease. From his experiments he thought that the incubative stage could be put down as seven days, that the disease was conveyed by *S. fasciata*, and that it was a mutant from yellow fever, differing from the typical dengue of Syria in the long incubative period, the slowness of the pulse, and the infection being carried by a Stegomyia.

Dr. C. H. Bradley utilised for inoculation purposes the blood of infected persons brought to Sydney by Cleland. The filtered citrated blood from one case gave negative results in five trials ; unfiltered serum from a second case gave one negative result. Two subjects received injections from the clot on the 8th April, and injections of serum or citrated blood on the 12th of April from dengue cases in the Sydney Coast Hospital. The disease declared itself on the 16th April. Five others were also inoculated with the same material from the Coast Hospital and none of them developed the disease ; therefore, he states, seven days would be the incubative period.

In the discussion which followed it was pointed out that it is unusual for the incubative period of specific diseases when conveyed by direct blood inoculations and by insect infections to be the same, and that the date of infection by mosquitoes in Dr. Cleland's case was uncertain as he had been bitten several times ; the blood inoculations were also complicated by two different methods being used on separate occasions for the same cases, therefore the period of incubation could not be fixed by these experiments.

[There is little doubt that the epidemic was one of true dengue and that it was spread by mosquito carriers. The slow pulse has been noticed often by others in endemic areas, particularly in that form classed as seven day fever, and this epidemic links up in a remarkable manner the seven day fever of ROGERS with true dengue. The suggestion that the fever was a variant of yellow fever is not sufficiently supported by the evidence to warrant it being brought forward.]

P. W. B-S.

MEAGHER (Edward T.). **On Dengue. Referring to an Epidemic at Bermuda.**—*Jl. Roy. Nav. Med. Serv.* 1916. Apr. Vol. 2. No. 2. pp. 188–190.

In the summer of 1915 there was a widespread epidemic of dengue at Bermuda, commencing in August and disappearing in October, the period of the hottest time of the year when mosquitoes were very numerous. It is stated that about half the total population, irrespective of colour, age and sex, was affected, but on board men-of-war visiting Bermuda the incidence was only about three per cent. The type of the disease was mild, the rash being often absent, but headache and pain in the eyes and back were always noted. H.M.S. "Cumberland" was in dock or alongside for 20 days; from her the author records seventeen cases or 2½ per cent. of her complement. All but one case occurred within a few days of sailing, but this man did not develop the disease until twenty-three days after leaving Bermuda. As the incubative period of dengue is six days, the etiology of this case is discussed and it is noted that mosquitoes were found on board for two or three weeks after leaving Bermuda and may have conveyed the infection from the sick to the healthy, but it was curious that none of the sick berth staff or others in close proximity to the patient developed the disease from him.

[As the last case developed the disease 23 days after leaving Bermuda and mosquitoes were only noticed for three weeks at sea, it is probable that the absence of further infection was because there were then no "carriers" present in the infective stage of the disease.]

P. W. B-S.

VINSON (L.). **Etude sur l'épidémie régnante dite de Dengue.**—*Bull. Soc. Med. de l'Ile Maurice.* 1915. Apr.–Dec. Vol. 33. 2nd Ser. No. 40. pp. 19–22.

In the winter of 1914 an epidemic classed as dengue was very prevalent in Mauritius. It was chiefly present in the higher parts of the island, the natives and those living in the coast towns and districts being but little affected. At Molka the author and members of his household contracted the disease, not all simultaneously, but in small groups of two or three. The symptoms however were so peculiar that the diagnosis of seven day fever was made. The differential characters of the two diseases, as given by ROGERS, are tabulated. In the Mauritius epidemic, the regularity of the fever, lasting generally six to eight days, associated with a relatively slow pulse, absence of severe articular

pains, rapid recovery, and freedom of chronic complications, was unlike what is generally found in true dengue. The disease was very contagious, attacking all ages and sexes indifferently.

Regarding the means of infection it was noted that in families living in the higher endemic regions, the only ones who escaped were those who during the day were employed in the town and returned home at night, this indicating a day-biting mosquito as the carrier.

P. W. B-S.

Pappataci Fever.

Ragazzi (Carlo). **Febbre de pappataci in Bengasi.**—*Malaria e Malat. d. Paesi Caldi.* 1916. Apr. 20. Vol. 7. No. 2. pp. 90–96.

The author during a study of the fevers occurring at Bengasi (Berenice) noted the occurrence of epidemics there of a short benign type which he recognised as phlebotomus fever. In 1856 and 1879 these fevers were classed as dengue or influenza and locally known as "Budabbus." In 1915 there were numerous cases with slight fever lasting generally two or three days and called gastric rheumatic fever. Two cases are described in detail. The first was typical, the second presented some characters of an irregular form of undulant fever but gave a negative serum reaction, the rheumatic pains and subsequent asthenia favouring this diagnosis. [Though two to three days is the usual duration of phlebotomus fever prolonged cases have been described by Spagnolio and others.] The disease was possibly conveyed by *P. minutus* var. *Africana* which frequently feeds upon the blood of a gecko, *Tarentula mauritanica*, found in the locality.

P. W. B-S.

Montefusco (Alfonso). **La febbre dei tre giorni a Napoli.**—*Riforma Med.* 1916. Jan. 31. Vol. 32. No. 5. pp. 120–122.

During November of 1915 a number of cases of fever occurred in 208 Battalion stationed at Granili, in which the diagnosis was difficult, these cases being variously described as rheumatism and influenza, but a certain number were definitely "three-day fever" forms, and due to infection by *P. papatasii.* The leucocytic formula of these was described as, Polynuclears 58 per cent., Eosinophiles 3 per cent., Mononuclears 13 per cent., Lymphocytes 20 per cent., Transitionals 6 per cent.; this constitutes a criterion of much importance in the diagnosis.

P. W. B-S.

Rat Bite Fever.

Fievez (J.). **Un Cas de Sokodu (Septicémie eruptive par morsure de rat) observé dans la zone des armées.**—*Paris Méd.* 1916. Apr. Vol. 6. No. 16. pp. 388–391.

The author describes in detail the case of a woman who was bitten by a rat in a village on the Meuse. The bite was on the left shoulder and the initial wound healed rapidly, but after an incubative period of fourteen days it was followed by inflammation at the site of the wound, which became ulcerated; lymphangitis was severe and the

glands were swollen. At the same time a generalised papulo-cutaneous eruption appeared, associated with marked fever and intense sweats. A week after this had passed off there was a second paroxysm but without fresh eruption, though the old one reappeared. A third abortive attack was noted, followed by complete recovery. No specific treatment was employed and attempts to obtain laboratory cultures from the serum of the papules failed.

P. W. B-S.

TILESTON (Wilder). **The Etiology and Treatment of Rat-Bite Fever.**—*Jl. Amer. Med. Assoc.* 1916. Apr. 1. Vol. 66. No. 14. pp. 995–998. With 4 figs.

The author describes a typical case of rat-bite fever which was admitted into the New Haven Hospital. During the paroxysms of fever he was able to demonstrate in the blood by dark ground illumination streptothrix like organisms 9 to 20μ long, similar to those described by SCHOTTMÜLLER and BLAKE. They were also stained with difficulty but inoculation into animals was unsuccessful. The organisms were non-motile and always disappeared from the blood between the attacks. Treatment with Fowler's solution had no apparent effect but an injection of salvarsan immediately cut short the fever, which did not return. A second case was also treated with salvarsan, followed by prompt recovery, but in this one blood examination gave negative results, probably because the blood had not become invaded by the organism.

P. W. B-S.

TUNNICLIFF (Ruth). **Streptothrix in Bronchopneumonia of Rats, Similar to that of Rat-Bite Fever. (A Preliminary Report).**—*Jl. Amer. Med. Assoc.* 1916. May 20. Vol. 66. No. 21. p. 1606.

This article is of considerable interest in that it supports the view that has lately been brought forward by American investigators that rat bite fever is caused by a streptothrix [see this *Bulletin*, Vol. 7, p. 160].

The author examined sixty rats showing signs of acute or chronic broncho-pneumonia and in smear preparations of fifty-six Gram-negative streptothrix organisms were found. By dark ground illumination, cork-screw like movements were observed, and with Levaditi's method of impregnation spiral forms were seen in the tissues. From twenty rats similar organisms were cultivated and in thirteen of these the culture was pure, the medium used being human blood agar, or ascitic goat blood agar ; the optimum temperature for growth was 37° C. Young healthy rats injected intraperitoneally show acute lesions in the lungs, and the same organism was isolated from the heart blood. The organism appears to be similar to that which was isolated by SCHOTTMÜLLER, *S. muris ratti.* The Levaditi specimens are very like those shown by FUTAKI and described by him as a spirochaete. "As the trachea of infected rats is full of mucus containing large numbers of the organisms it is readily seen that a bite from such a rat might be infectious."

P. W. B-S.

Rocky Mountain Spotted Fever.

Wolbach (S. B.). **The Etiology of Rocky Mountain Spotted Fever. (A Preliminary Report).**—*Jl. Med. Res.* 1916. Mar. Vol. 34. No. 1. pp. 121–126. With 1 plate.

Ticks (*Dermacentor venustus*) infected with the virus of Rocky Mountain Spotted Fever were received by the author from Surgeon L. D. Fricks of the United States Public Health Service. From both male and female ticks guinea-pigs were infected, and these developed symptoms characteristic of the disease and no difficulty has been experienced in maintaining a series of infected animals.

The essential lesions of spotted fever are found in the vascular system and bacillary bodies, having some of the characters of those described by Ricketts, were present in large numbers in the endothelial cells of the animals examined; these cells accumulate in the vessel walls and around the vessels and in the lymphatics. The organisms are diplo-bacillary in character and show polar staining, but the colouration with Giemsa stain is not that commonly seen with most bacilli and indicates that the organisms have some of the characters of spirochaetes; in stained tissues this peculiarity is most marked. The organisms are also abundant in the muscle cells of blood vessels. All attempts at cultivation have so far failed. The technique employed is fully described and photo-micrographs are given showing the diplo-bacilli in situ.

P. W. B-S.

Michie (H. C.) & Parsons (H. H.). **Rocky Mountain Spotted (Tick) Fever; Report of an Investigation in the Bitter Root Valley of Montana.**—*Med. Record.* 1916. Feb. 12. Vol. 89. No. 7. (Whole No. 2362.) pp. 265–277. With 2 maps & 2 charts.

In this most interesting paper the authors review our whole knowledge on the subject and give the results of a most careful study of the disease, which extended over a period of more than two years. Laboratory methods were extensively used. The disease is of a very restricted endemic character and is undoubtedly conveyed by ticks, which abound in the spring and summer seasons, but they were unable to confirm the view propounded by Wilson, Anderson and Chowning, that it was due to an intra-cellular piroplasm (*P. hominis*) nor that of Stiles, Ashburn, and Craig that the cause was a trypanosome; the causative agent being yet undiscovered. There is evidently some difference in the Montana and Idaho strains of the infective organism, as in the former cases the mortality is about 3 per cent., and in the latter 75 per cent. There is no doubt that the infective agent is in the salivary glands of the tick (*Dermacentor venustus* and *D. modestus*) as shown by Ricketts, and is conveyed by the bite of these ticks, but for a successful inoculation the minimum time with a guinea-pig was one hour and forty-five minutes, and it requires twenty-four hours for a normal tick to become infected from a guinea-pig suffering from the disease, important points to remember when considering prophylaxis. No race, age, or sex is immune and no case of chronic spotted fever in man is known; one attack gives complete immunity and the young of immune female guinea-pigs possess a certain amount of immunity.

A full description of the symptoms is given. The disease is characterised by sudden onset, continued fever, enlarged spleen, early albuminuria, slow pulse, pain in the head, neck, back, and joints, and a characteristic eruption. The diagnosis has chiefly to be made from typhus fever. The virus is contained in the blood during the febrile period only, and is present in the red cells, white cells, and serum; it is also found in the liver and spleen. After death the internal organs are markedly congested; haemorrhages and patches of gangrene are often present. For treatment immune serum from horses has not given encouraging results and atoxyl and salvarsan are worse than useless, but the authors found that a sodium citrate solution was useful for animals; they were not able to test it on man. They suggest that sixty cc. of a 5 per cent. sterile, freshly prepared solution should be given intravenously. For prophylaxis the inhabitants of infected districts should be taught the method of transmission by the tick and to discredit all other suggested means, and every effort should be made to destroy the ticks. Two cases are described in detail and there is a full list of Bibliographic references.

All interested in the disease should study the original paper.

P. W. B-S.

FRICKS (L. D.). **Rocky Mountain Spotted Fever. A Report of Laboratory Investigations of the Virus.**—*U. S. Public Health Rep.* 1916. Mar. 3. Vol. 31. No. 9. pp. 516–521. With 1 fig.

It has been proved that the virus of Rocky Mountain Spotted Fever is present in the peripheral blood, is conveyed by ticks (*Dermacentor*) and their progeny, and that guinea-pigs and white rats are susceptible. Various organisms have been found in the blood and have been described as the possible cause, but none have been sufficiently confirmed. The Public Health Service has taken up the study and many investigations have been carried out in the field laboratory at Victor, Mont., and at Washington. All attempts to cultivate the virus aerobically have failed, but ten strains of anaerobic bacilli have been isolated; these however are not pathogenic to guinea-pigs and are not agglutinated by immune guinea-pig serum. They resemble closely the organisms isolated from typhus fever blood by HASSELTINE and NEILL and that isolated by PLOTZ under the name of *B. typhi exanthematici.* The technique employed in the present research to grow the virus anaerobically is described and the apparatus is figured. Forty-seven cultures were made and ninety-seven guinea-pigs were inoculated; the cultures were from two days to one month old when used. Three guinea-pigs out of ten, inoculated with cultures 21–25 days old, either showed definite lesions of spotted fever or were immune, and from these experiments it is concluded that a multiplication of the virus occurred in the cultures. By centrifuging the serum under special conditions the author was able to cause infection of a guinea-pig with three drops of the sediment, the supernatant fluid being harmless. Microscopical examination of the infected guinea-pig's blood showed chromatin bodies both in the red blood cells and the plasma; the intracellular bodies resemble those described by SEIDELIN in yellow fever blood and are believed to be protozoal in character, but no definite conclusions can at present be arrived at with regard to their etiological significance, further research being required.

P. W. B-S.

SMITH (M. H.). **Rocky Mountain Spotted Fever treated with Adrenal Secretion.**—*Med. Record.* 1915. Oct. 2. Vol. 88. No. 14. [Whole No. 2343.] p. 568.

The author, who writes from Basin, Wyoming, was led to try this treatment by the views expressed by SAJOUS in his "Internal Secretions and the Principles of Medicine." Three cases were subjected to treatment. The symptoms and details of treatment are shown in a table. In two cases calcium was also used. All recovered. The author states that the febrile disturbance was shortened. The normal death-rate is not stated.

A. G. B.

VERRUGA PERUVIANA.

TOWNSEND (C. H. T.). **Identification of the Stages in the Asexual Cycle of *Bartonella bacilliformis*, the Pathogenic Organism of Verruga, and their Bearing on the Etiology and Unity of the Disease.**—*Jl. Washington Acad. Sci.* 1915. Dec. 19. Vol. 5. No. 21. pp. 662–667.

The author takes it as proved that a species of Phlebotomus (*P. verrucarum*) is the transmitter of both Oroya fever and verruga, which exist endemically in Peru, and that these are stages of the same disease. Almost every investigator has recognised the minute bodies in the red blood cells of the fever patients and has failed to find them in those suffering from the eruptive condition. The small bodies described by DARLING as seen in the red cells and called by him X bodies are recognised by the author as immature gametes; the Leishmania-like bodies described by GASTIABURU in verruga eruption tissue and in the liver of verruga patients as early and maturing schizonts, and the "cell inclusions" of MAYER and ROCHA-LIMA found in the vascular endothelial cells of verruga nodules, are maturing Bartonella schizonts and merozoits due to the breaking up of the schizonts. These according to the author are different stages of the same parasite. STRONG has shown that the evolution of the organism of Oroya fever takes place in the endothelial cells of the small blood vessels, but he failed to connect these organisms with any of the bodies found in verruga tissues, as claimed by TOWNSEND, and the whole hypothesis whether the two conditions are one and the same disease hangs upon this identity. The author postulates that the sporozoits are introduced into the blood by the Phlebotomus; these find their way into the vascular endothelial cells, becoming schizonts, and pass through the unruptured walls of the infected cells into the red cells which come into direct contact with them; the rods and ovals seen in the red cells are the male and female gametes which can conjugate only in the Phlebotomus, the fever stage corresponding to a heavy infection of the red cells. The eruption, when there is a great proliferation of the vascular endothelial cells, is due to extensive asexual multiplication of the parasite in the subcutaneous tissues, and the absence of the parasites in the blood cells is due to the proliferation of the cells preventing the red cells coming in contact with those ones containing merozoits, so the fever subsides and the gametes are no longer in the circulating blood. As the red cells can only become infected while in direct contact with the infected endothelial cells in the capillary walls, so the implantation of verruga eruptive tissue acts only as a local irritant or graft, the subsequent cell proliferation being due to a toxin and not to a virus introduced.

The internal eruptions (*denied* by STRONG) are due to the sporozoits carried by the lymph stream, which have failed to embed themselves in the subcutaneous tissues.

The author states that the fever and eruptive stages correspond very generally in intensity, but when this is not marked it is due to the production of antibodies cutting short the asexual multiplication of the parasite in the subcutaneous tissues.

[The pathological and histological findings are of great interest and importance, but the crux of the question lies in the transference of one or both diseases to animals and the immunity conferred. These so far point to the duality of the diseases.]

P. W. B-S.

TOWNSEND (Charles H. T.). **Note on the Etiology of Verruga as deduced from a Study of the Asexual Stages of Bartonella.**—*Jl. Parasit.* 1916. Mar. Vol. 2. No. 3. pp. 143–144.

This is an abstract of a paper read before the Second Pan-American Scientific Congress in January 1916, in which the author describes his recent researches on the etiology of verruga. His belief in the identity of Oroya fever and verruga is consistently maintained, but the hypothesis of the method of production of the verruga lesion by means of the toxic action on the endothelial cells of a generative stage of the Bartonella parasite requires more support and confirmation. The original paper will be looked forward to with interest.

P. W. B-S.

TOWNSEND (C. H. T.). **Recent Questioning of the Transmission of Verruga by Phlebotomus.**—*Bull. Entom. Res.* 1916. Feb. Vol. 6. Pt. 4. pp. 409–411.

This is a very controversial expression of the author's views, which have been criticised in the Report of the First Expedition to South America, Harvard School of Tropical Medicine, by STRONG, TYZZER, SELLARDS, BRUES, and GASTIABURU [see this *Bulletin*, Vol. 7, p. 73]. It contains no new facts and both his papers and the reports of the Harvard Expedition have been previously dealt with in this *Bulletin*. The author states that the Reporters "declined to visit with him at night the infected zone (Verrugas Canyon) and that they collected no insects that have any bearing on the transmission of verruga." He finds no evidence that either mosquitoes or ticks transmit the disease, the vector of which must be a nocturnal blood sucker, abundant in the wet season but never absent all the year round, and that the *P. verrucarum* is the only species that meets these requirements.

P. W. B-S.

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AMOEBIASIS (including Entamoebic Dysentery and Liver Abscess).

ALLAN (William). Clinical Notes on the Use of Alcresta Ipecac in Amebic Dysentery.—*Amer. Jl. Trop. Dis. & Prevent. Med.*, 1916. May. Vol. 3. No. 11. pp. 602–606.

ANNALI DI MEDICINA NAVALE E COLONIALE. 1916. Mar.–Apr. Ann. 22. Vol. 1. No. 3–4. 24 pp. With 1 coloured plate, 1 map and 6 figs. Supplement.—Dissenteria amebica. Note epidemiologiche, cliniche e profilattiche.

[Another of the practical monographs on epidemic diseases which are being issued by this journal for the guidance of Italian army surgeons, under the superintendence of Professor GABBI.]

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CANNATA (S.). Sulla dissenteria amebica nell' infanzia.—*Pediatria*, 1916. June. Vol. 24. No. 6. pp. 359–362.

CECIKAS (I.). Sur quelques traits de la dysenterie amibienne en Grèce.—*Grèce Méd.* 1916. Feb. 1 and 15. Vol. 18. No. 3–4. pp. 6–8.

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GORDON (A. H.). Amoebic Dysentery—Amoebic Abscess of the Liver.—*Canadian Med. Assoc. Jl.*, 1916. May. Vol. 6. No. 5. pp. 426–428.

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[This is a useful compendium of our knowledge of the pathology and treatment of amoebic dysentery to date but contains no new matter.]

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PENFOLD (W. J.), WOODCOCK (H. M.) & DREW (A. H.). The Excystation of *Entamoeba histolytica* (*tetragena*) as an Indication of the Vitality of the Cysts.—*Brit. Med. Jl.*, 1916. May 20. pp. 714–715. With 8 figs.

RAVAUT (Paul) & KROLUNITSKI (G.). Pourquoi avons-nous failli méconnaître la dysenterie amibienne ?—*Presse Méd.*, 1916. Apr. Vol. 24. No. 22. pp. 169–172. With 2 text figs.

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See also **Dysentery (Unclassed).**

BERIBERI and POLYNEURITIS AVIUM.

BREINL (A.). Note on Experiments on Polyneuritis in Pigeons.—*Jl. Trop. Med. & Hyg.*, 1916. June 1. Vol. 19. No. 11. pp. 129–130.

FLEMING (Robert A.) & GIBSON (H. J. C.). Three Cases of Beriberi.—*Edinburgh Med. Jl.*, 1916. July. New Ser. Vol. 17. No. 1. pp. 27–33.

GESTEIRA (Martagão). Um caso de beriberi infantil.—*Brazil Medico.*, 1916. July 1. Vol. 30. No. 27. pp. 209–212. With 1 fig.

MCCOLLUM (E. V.) & KENNEDY (Cornelia). The Dietary Factors Operating in the Production of Polyneuritis.—*Jl. Biol. Chem.*, 1916. Apr. Vol. 24. No. 4. pp. 491–502.

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CHOLERA.

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[A resumé of the accepted teachings intended for inclusion in a handbook for medical men on active service.]

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[Of local interest only.]

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BRYSON (R.). Some Cholera Experiences.—*Indian Med. Gaz.*, 1915. Oct. Vol. 50. No. 10. pp. 374–377.

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[A paper concerned with the Balkan epidemic of 1912 but containing nothing new.]

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ERDHEIM (J.) & SCHOPPER (K. J.). Cholerabekämpfung.—*Wien. Klin. Woch.*, 1916. June 22. Vol. 29. No. 25. pp. 769–773.

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GREIG (E. D. W.). Further Observations on Lesions of the Biliary Passages of Rabbits dying after Repeated Intravenous Injections of Living Vibrios. A Contribution to the Study of Experimental Cholera Infection.—*Indian Jl. Med. Res.*, 1916. Jan. Vol. 3. No. 3. pp. 397–441. With 1 plate and 1 chart.

——. On the Alteration in Serological and Morphological Characters of a Strain of Vibrio.—*Indian Jl. Med. Res.*, 1916. Jan. Vol. 3. No. 3. pp. 442–453. With 2 charts and 1 plate.

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[A long and detailed clinical and histological account of the disease, not lending itself to reviewing or excerpting, but requiring to be read in full.]

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IONESCO-MIHAIESTI (G.) & CIUCA (M.). Sur la recherche de l'agglutinine anticholérique dans le sérum des individus vaccinés contre le choléra. Choix d'un antigène. (A propos de la communication de MM. Danila et Stroe).—*C. R. Soc. Biol.*, 1916. June 3. Vol. 79. No. 11. pp. 536–539.

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VON KUTSCHERA (Hans). Zur Technik der Schutzimpfung gegen Typhus und Cholera im Felde.—*München. Med. Woch.*, 1916. June 20. Vol. 63. No. 25. pp. 917–918.

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[A lecture to students on cholera.]

MAJUMDAR (S. K.). Intravenous Saline in Cholera.—A Contra Indication. [Correspondence.]—*Indian Med. Gaz.*, 1916. May. Vol. 51. No. 5. p. 195.

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TARASSEVITCH (L.), AJEXINA (L.), GLOTOVA (H.) & FEDOROVITCH (A.). Vaccination mixte contre la fièvre typhoïde et le choléra.—*C. R. Soc. Biol.*, 1916. June 17. Vol. 79. No. 12. pp. 564–566.

TEAGUE (Oscar) & TRAVIS (W. C.). A New Differential Culture Medium for the Cholera Vibrio.—*Jl. Infect. Dis.*, 1916. June. Vol. 18. No. 6. pp. 601–605. With 1 plate.

DYSENTERY (Bacillary and Unclassed).

(A.) Bacillary.

BONNEL (F.), JOLTRAIN (E.) & TAUFLIEB (R.). A propos d'une petite épidémie de dysenterie bacillaire observée dans la zone des armées pendant l'été 1915.—*Bull. et Mém. Soc. Méd. des Hôpit. de Paris*, 1916. Apr. 20. 3 ser. Vol. 32. No. 13–14. pp. 589–599. With 3 figs.

BOUDET (Gabriel). Une épidémie de dysenterie bacillaire observée pendant l'été de 1915, à Guercif (Maroc Oriental).—*Presse Méd.*, 1916. June 29. No. 36. pp. 281–284. With 6 curves.

FLEXNER (Simon). The Rapid Production of Antidysenteric and Antimeningococcic Sera.—*Jl. State Med.*, 1916. June. Vol. 24. No. 6. pp. 161–171; July. No. 7. pp. 193–206. With 5 charts.

GABBI (Umberto) & VANZETTI (Ferruccio). Sulla sindrome, anatomia patologica ed etiologia della dissenteria bacillare osservata nei prigionieri austriaci provenienti dalla Serbia e raccolti all' Asinara. —*Malaria e Malat. d. Paesi Caldi*, 1916. May-June. Vol. 7. No. 3. pp. 151–159.

JACOBITZ. Ueber Ruhrbacillen Agglutination.—*Berlin. Klin. Woch.*, 1916. June 26. Vol. 53. No. 26. pp. 718–719.

LOEWY (Otto). Dysenterieschutzimpfung.—*Wien. Klin. Woch.*, 1916. May 18. Vol. 29. No. 20. pp. 617–619.

MALARIA E MALATTIE DEI PAESI CALDI. 1916. May–June. Vol. 7. No. 3. pp. 204–218. With a map.—Dissenteria bacillare epidemica. Pubblicazioni monografiche delle malattie degli eserciti in guerra della Scuole delle malattie esotiche annessa alla R. Clinica Medica di Roma. [Gabbi (U.) & Giugni (Fr.).]

REMLINGER (P.). Sur un nouveau bacille dysentérique atypique.—*C. R. Soc. Biol.*, 1916. June 17. Vol. 79. No. 12. pp. 576–578.

RITCHIE (T. R.). On the Agglutination Reaction of the Bacilli of the Typhoid-Dysentery Group with Normal Sera.—*Lancet*, 1916. June 24. pp. 1257–1260. With 2 figs.

SNIJDERS (E. P.). Over de beteekenis der agglutinatie van dysenteriestammen met menschensera.—*Geneesk. Tijdschr. v. Nederl.-Indië*, 1916. Vol. 56. No. 2. pp. 105–137.

SUTHERLAND (P. L.). Bacillary Dysentery (Shiga) contracted in England. —*Brit. Med. Jl.*, 1916. July 29. p. 142.

TEN BROECK (Carl) & NORBURY (Frank Garm). *B. dysenteriae* as a Cause of Infectious Diarrhoea in Infants.—*Boston Med. & Surg. Jl.*, 1916. June 1. Vol. 174. No. 22. pp. 785–788.

(B.) Unclassed.

ARNETH-Münster. Ueber Darmkatarrh, fieberhaften Darmkatarrh, Typhus, Ruhr und Mischinfektionen.—*Berlin. Klin. Woch.*, 1916. Feb. 28. Vol. 53. No. 9. pp. 213–215.

[Nothing new.]

BALFOUR (Andrew). Notes sur le traitement de la diarrhée et de la dysenterie, arrêtées par la Commission Médicale chargée de la prévention des maladies contagieuses dans le corps expéditionnaire méditerranéen.—*Bull. Off. Intern. d'Hyg. Pub.*, 1916. Apr. Vol. 8. No. 4. pp. 632–641.

[Translated from *Jl. R. Army Med. Corps.* Vol. 25. No. 5.]

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CHOWANIEC (Wanda). Ein interessanter Fall von Dick- und Dünndarmdysenterie.—*Wien. Klin. Woch.*, 1916. May 11. Vol. 29. No. 19. pp. 583–584.

DIRKS (Emil). Beitrag zur Bolus-alba-Behandlung bei Ruhr.—*München. Med. Woch.*, 1916. Mar. 21. Vol. 63. No. 12. pp. 441–442.

FANTHAM (H. B.). Remarks on the Nature and Distribution of the Parasites observed in the Stools of 1,305 Dysenteric Patients.—*Lancet*, 1916. June 10. pp. 1165–1166.

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GUNSON (E. B.). Cardiac Symptoms following Dysentery among Soldiers. —*Lancet*, 1916. July 22. pp. 146–147.

HALL (I. Walker), ADAM (D. C.) & SAVAGE (R. E.). Convalescent Paratyphoidal and Dysenteric Cases considered from the Preventive Standpoint.—*Brit. Med. Jl.*, 1916. Aug. 5. pp. 174–177.

KENNEDY (Alex Mills) & ROSEWARNE (D. D.). *Lamblia intestinalis* Infections from Gallipoli.—*Lancet*, 1916. June 10. pp. 1163–1165.

KOELISCH. Ueber die Beziehungen zwischen Typhus, Paratyphus, Ruhr, fieberhaften und fieberlosem Darmkatarrh.—*Berlin. Klin. Woch.*, 1916. Apr. 3. Vol. 53. No. 14. pp. 355–362.

[This is a rather long article, for the most part of a speculative nature dealing with bacterial variation, of interest only to specialists in that subject.]

LIEBERS. Ueber Polyneuritis nach Enteritis.—*München. Med. Woch.*, 1916. Mar. 7. Vol. 63. No. 10. pp. 369–370.

LOW (G. C.). Dysenteries other than Amoebic.—*Practitioner*, 1916. May. 16 pp.

[A general account of non-amoebic dysentery. Nothing new.]

MARTINEZ (F. F.). Les premiers cas de dysenterie tropicale en Espagne.—*Presse Méd.*, 1916. June 29. No. 36. pp. 284–285.

ORTICONI (A.) & NEPVEUX. Sur l'étiologie de quelques diarrhées et dysenteries rebelles.—*Bull. Soc. Path. Exot.*, 1916. May. Vol. 9. No. 5. pp. 293–299.

PELLIER (C. de C.). A Severe Case of Dysentery treated with Antidysenteric Serum (Lister's).—*St. Barth. Hosp. Jl.*, 1915. Dec. Vol. 23. No. 3. pp. 31–32.

[Trifling contribution.]

PORTER (Annie). An Enumerative Study of the Cysts of *Giardia* (*Lamblia*) *intestinalis* in Human Dysenteric Faeces.—*Lancet*, 1916. June 10. pp. 1166–1169. With 7 charts.

ROSE (Carl Wienand). Ruhrnachkrankheiten und deren Behandlung mit Antidysenterieserum.—*Berlin. Klin. Woch.*, 1916. June 12. Vol. 53. No. 24. pp. 646–648.

SANGIORGI (Guiseppe). Lamblie e spironemacee nell' intestino umano.—*Pathologica*, 1916. May 15. Vol. 8. No. 181. pp. 162–164.

SHAW (H. L.). Experiences with Emetine in Dysenteric Conditions.—*Jl. S. Carolina Med. Ass.*, 1916. Vol. 12. pp. 40–44. [*Index Medicus.*]

TRIBONDEAU (L.) & FICHET (M.). Note sur les dysenteries des Dardanelles.—*Ann. Inst. Pasteur*, 1916. July. Vol. 30. No. 7. pp. 357–362

VILLA ALVAREZ (Alejandro). Trichomonosis intestinal. Tesis. x + 99 pp. With 4 plates. 1916. Bogota, Colombia: J. Casis, 254, Carrera 6.

[The work consists very largely of an historical resumé of trichomoniasis, more especially as it has been observed in South America. The history and geographical distribution are now noted. A fairly full account of the symptoms compiled from the accounts of other authors, such as Brumpt, Castellani and Chalmers, Escomel, is given, the chief new point being that one of the characteristics of trichomonas dysentery is its tendency to pass into the chronic state. The pathology and morbid anatomy are discussed from the historical standpoint. A poor account of the morphology and life-history of Trichomonas is given. There are numerous inaccuracies in spelling, e.g., p. 55, Hexa Mastix Andri Deiteil is the rendering of Hexamastix Ardin Delteili, while Ardil Deiteil, Brump, Chatterger, all occur and in some cases are repeated. The account of treatment is a compilation on the same plan as the rest of the book.]

FEVERS (Unclassed) and DENGUE.

CLELAND & BRADLEY. [Discussion on Dengue].—*Med. Jl. of Australia*, 1916. May 6. Vol. 1. 3rd Year. No. 19. pp. 386–387.

GAITAN U. (A.). Fiebres biliosépticas.—*Repertorio de Med. y Cirug.*, 1916. June. Vol. 7. No. 9. (No. 81.) pp. 387–405.

GOLDSMID (J. Albert) & CROSSE (Walter). Some Notes on Dengue.—*Med. Jl. of Australia*, 1916. May 6. Vol. 1. 3rd Year. No. 19. pp. 377–378.

KAPP (Josef). Eine eigenartige Epidemie. [Pappatacifieber, Influenza, oder Malaria ?]—*München. Med. Woch.*, 1915. Nov. 16. Vol. 62. No. 46. p. 1590.

ROBB (R. M.). Heat Fever (Non-Infective Cerebro-spinal Fever).—*S. African Med. Rec.*, 1916. May 27. Vol. 14. No. 10. pp. 154–155.

SPAAR (Eric C.). Notes on a Further Case of Fever due to *Bacterium columbense*.—*St. Bart. Hosp. Jl.*, 1916. Feb. Vol. 23. No. 5. pp. 61–62.

VINSON (L.). Etude sur l'épidémie régnante dite de Dengue.—*Bull. Soc. Med. de l'Ile Maurice*, 1915. Apr.–Dec. Vol. 33. 2 ser. No. 40. pp. 19–22.

WEITZ. Ueber zwei Fälle von Fünftagefieber.—*Med. Klinik*, 1916. June 18. Vol. 12. No. 25. p. 669.

HELMINTHIASIS.

TREMATODES.

Distomiasis.

YOSHIDA (Sadao). On the Intermediate Hosts of the Lung Distome, *P. westermani* Kerbert.—*Jl. Parasit.*, 1916. Mar. Vol. 11. No. 9. pp. 111–117. With 1 plate.

——. Some Notes on the Encysted Larva of the Lung Distome.—*Jl. Parasit.*, 1916. June. Vol. 4. No. 2. pp. 175–180. With 4 figs.

Schistosomiasis.

BECKER (J. G.). A Preliminary Note on an Intermediate Host of *Bilharzia haematobium* in the Transvaal, together with a Description of the Cercariae with which the Mollusc is infected.—*Med. Jl. of S. Africa*, 1916. Apr. Vol. 11. No. 9. p. 156. With 1 plate.

BURRES (W. T.). Intestinal Bilharziosis in Western Panama.—*Amer. Jl. Trop. Dis. & Prevent. Med.*, 1916. May. Vol. 3. No. 11. pp. 611–612.

CAWSTON (F. G.). The Cause and Effect of Bilharzia Disease in South Africa, Egypt, and the Far East.—*S. African Med. Rec.*, 1916. June 10. Vol. 14. No. 11. pp. 163–164.

——. Some Observations on the Possible Intermediary Hosts of Schistosoma in Natal.—*Jl. Trop. Med. & Hyg.*, 1916. July 1. Vol. 19. No. 13. p. 154. With 4 figs.

[The subject matter of this note has already been reviewed in this *Bulletin*—*vide* Vol. 7. No. 6, and Vol. 8. No. 3.]]

——. The Prevention of Bilharzia Infection. [Correspondence.]—*Lancet*, 1916. July 15. p. 121.

——. The Duration of Bilharziosis in South Africa.—*Brit. Med Jl.*, 1916. July 29. p. 144.

CESTODES.

ANCONA (Arrigo). Per un nuovo caso di elementiasi da *Dipylidium caninum* nell' uomo.—*Riforma Med.*, 1916. June 12. Vol. 32. No. 24. pp. 652–655.

BETTENCOURT (A.). Casos de infestaçao pela *Hymenolepis nana* em Portugal.—*Med. Contemporanea*, 1916. June 18. Vol. 34. No. 25. p. 193.

SINGER (J. J.). A Case of *Bothriocephalus latus* Infection.—*Jl. Amer. Med. Assoc.*, 1916. May 20. Vol. 66. No. 21. pp. 1618–1619.

STEWART (F. H.). *Hymenolepis nana* (Siebold). (The Dwarf Tapeworm) as a parasite of Indian Soldiers.—*Indian Med. Gaz.*, 1916. June. Vol. 51. No. 6. pp. 218–219. With 2 figs.

NEMATODES.

da MATTA (Alfredo A.). Os nematoides do tubo digestivo de que modo infestam o organismo? Prophylaxia.—*Brazil Medico*, 1916. Apr. 15. Vol. 30. No. 16. pp. 121–124.

Ascariasis.

ROSS (Ronald). The Life History of *Ascaris lumbricoides*. [Correspondence.]—*Brit. Med. Jl.*, 1916. July 8. pp. 60–61.

STEWART (F. H.). On the Life-History of *Ascaris lumbricoides*.—*Brit. Med. Jl.*, 1916. July. 1. pp. 5–7. With 4 figs.

Ankylostomiasis.

ELMENDORF (M. F.) & WALKER (J. E.). Hookwarm History Schedules of Two Male Patients treated with Oil of Chenopodium at the U.S. Marine Hospital, Wilmington, N.C.—*Virginia M. Semi-Month*, 1915–16. Vol. 20. pp. 552–555. [*Index Medicus.*]

KEITH (R. D.). Ankylostomiasis: Diagnosis and Treatment.—*Jl. Trop. Med. & Hyg.*, 1916. June 1. Vol. 19. No. 11. pp. 130–131.

MCGRAW (S. J.). Hookworm.—*Jl. Arkansas Med. Soc.*, 1916. Vol. 12. pp. 248–251. [*Index Medicus.*]

Filariasis.

BOCKHORN (M.). Schlusswort zu den Bemerkungen von Rodenwaldt.—*Med. Klinik*, 1915. Oct. 31. Vol. 11. No. 44. pp. 1212–1213. [No new information is contained in the above note.]

DUBOIS (A.). Le rôle pathogène de *Onchocerca volvulus*, Leuckart.—*Bull. Soc. Path. Exot.*, 1916. May. Vol. 9. No. 5. pp. 305–309.

FAMULARI (Sebastiano). Il primo esempio autoctono di Filariosi in Sicilia.—*Malaria e Malat. d. Paesi Caldi*, 1916. May–June. Vol. 7. No. 3. pp. 141–145. With 1 coloured plate.

LAVERAN (A.). Sur un cas de filariose due à *F. loa* d'une durée de 14 années.—*Bull. Soc. Path. Exot.*, 1916. July. Vol. 9. No. 7. pp. 436–438.

WARD (Henry B.). Gongylonema in the Role of a Human Parasite.—*Jl. Parasit.*, 1916. Mar. Vol. 2. No. 3. pp. 119–125. With 1 plate.

GENERAL AND UNCLASSED.

LANE (Clayton). The Correct Names of the Helminths of Man.—*Indian Med. Gaz.*, 1916. May. Vol. 51. No. 5. pp. 165–173.

SANGIORGI (G.). Osservazioni sulle feci dei soldati ricoverati negli ospedali militari territoriali di Venezia.—*Giorn. di Med. Milit*, 1916. Apr. 30. Vol. 64. No. 4. pp. 278–281.

KALA AZAR (and Tropical Sore).

BOUILLIEZ (M.). Un cas de kala-azar infantile au Moyen-Chari (Territoire du Tchad).—*Bull. Soc. Path. Exot.*, 1916. May. Vol. 9. No. 5. pp. 299–302. With 1 fig.

FINZI (Guido). Leishmaniose et tuberculose chez le chien.—*Bull. Soc. Path. Exot.*, 1916. July. Vol. 9. No. 7. pp. 429–432.

LIGNOS (A.). La leishmaniose canine à Hydra.—*Bull. Soc. Path. Exot.*, 1916. May. Vol. 9. No. 5. p. 302.

NICOLLE (Charles). Chronique du kala azar en Tunisie.—*Arch. Inst. Pasteur Tunis*, 1916. Apr. 1. Vol. 9. No. 3. pp. 176–179.

RAI U. N. BRAHMACHARI BAHADUR. Third Report on the Treatment of Kala-Azar with Special Reference to the Use of Antimony and Formaldehyde.—*Indian Med. Gaz.*, 1916. May. Vol. 51. No. 5. pp. 173–178. With 4 charts.

WARD (Gordon R.). Kala-Azar in Soldiers returning from Malta.—*Lancet*, 1916. July 1. pp. 16–17.

Tropical Sore (Dermal Leishmaniasis).

DUDDING (J. S.). A New Treatment for "Oriental Sore."—*Jl. Roy. Nav. Med. Serv.*, 1916. July. Vol. 2. No. 3. p. 348.

La CAVA (F.). Leishmaniosi esterna (bottone d'Oriente), leishmaniosi delle mucose, leishmaniosi interna (kala-azar).—*Boll. d. Soc. Med-Chir. di Pavia.*, 1914. Vol. 28. pp. 173–186. With 4 plates. [*Index Medicus.*]

da MATTA (Alfr.). Sur les leishmanioses tégumentaires. Classification générale des leishmanioses.—*Bull. Soc. Path. Exot.*, 1916. July. Vol. 9. No. 7. pp. 494–503. With 2 plates.

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LEPROSY.

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[A clinical lecture on pneumonic plague.]

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RELAPSING FEVER (and Spirochaetosis).

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[A general account of relapsing fever, on the lines of a modern text-book.]

HAGLER (Frederic). Relapsing Fever.—*Military Surgeon*, 1916. July. Vol. 39. No. 1, pp. 36–43. With 2 plates.

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MARTIN (Louis) & PETTIT (Auguste). Présentation de préparations microscopiques et de pièces anatomopathologiques, relatives à la spirochétose ictérohémorragique.—*C. R. Soc. Biol.*, 1916. July 22. Vol. 79. No. 14. p. 657.

PRUESSIAN. Ueber eine mit Neosalvarsan behandelte Rekurrens-Epidemie.—*München. Med. Woch.*, 1916. Mar. 7. Vol. 63. No. 10. pp. 344–348. With 16 curves.

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SERGENT (Edmond) and FOLEY (Henri). Epidémiologie de la fièvre récurrente.—*Malaria e Malat. d. Paesi Caldi.*, 1916. Jan. Vol. 7. No. 1. pp. 1–7. With 1 chart.

[This is an interesting general account of North African relapsing fever due to *Spirochaeta berbera*. The authors deal with the transmission by lice, with contamination experiments, with the development of the spirochaetes in the louse and in man, and with immunity, which is of short duration. References to the literature, which has already been summarised in this *Bulletin*, are given.]

SIMPSON (W. J.). Memorandum on Spirochaetes in the Gold Coast.—*Jl. Trop. Med. & Hyg.*, 1916. Apr. 15. Vol. 19. No. 8. p. 94.

[A record of a case of relapsing fever in a Krooman at Cape Coast in the Gold Coast Colony, observed in 1908.]

TREMBUR (F.) & SCHALLERT (R.). Zur Klinik der Weilschen Krankheit.—*Med. Klinik.*, 1916. Apr. 16. Vol. 12. No. 16. pp. 414–416. With 4 charts.

[A general account of the clinical manifestations of Weil's disease. Examinations of the blood of the patients were negative. The author does not appear to know that a spirochaete has been implicated as the excitant of the malady.]

WUERTZEN (C. H.). Et Tifaelde af Fb. recurrens behandlet med Neosalvarsan.—*Ugeskr. f. Laeger*, 1915. Vol. 77. pp. 1970–1977. [*Index Medicus.*]

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——. Traitement rapide de l'ulcère phagédénique des pays chauds.—*Bull. Soc. Path. Exot.*, 1916. July. Vol. 9. No. 7. pp. 419–425.

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LECOMTE (A.) & HECKENROTH (F.). Traitement et évolution d'un Mycétome à grains rouges.—*Bull. Soc. Path. Exot.*, 1916. June. Vol. 9. No. 6. pp. 346–351. With 1 plate.

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[A short note claiming priority for Dr. S. MONTIEL as the first to observe actinomycosis in Venezuela.]

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[The paper consists of a "condensed summary of our present knowledge relative to the function of the louse in typhus-fever epidemics, and the methods employed for the destruction of the insect during the present war in Europe." It contains an account of the presumed causal agent of typhus, of certain biological characteristics of lice and a number of the methods for the destruction of lice, as set forth in papers by Austrian and German workers, whose papers along with others on the same topic have already been reviewed in this Bulletin. The photographs illustrate the various forms of field disinfection of men and clothing that have been in use from time to time.]

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[The paper contains a summary of the author's researches already published as separate communications. and reviewed in this *Bulletin*, Vol. 6, p. 8, & Vol. 7, pp. 154, 155.]

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